

# A MODAL STUDY OF *THE SACRED HARP* (DENSON BOOK)

## 1991 EDITION

by David G. Jensen

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# Introduction to a Modal Study of *The Sacred Harp* (1991)

by David G. Jensen

The object of this study is to examine the modality of Early American folk hymnody, in particular that preserved in the current (1991) edition of *The Sacred Harp* (Denson editorial lineage, the best known and most widely used of several versions descended from the book first published in 1844). For years confined to rural areas of the American South, singings from this book are now found worldwide. The genesis of *The Sacred Harp* and the shape-note tradition in general is well documented elsewhere, and so is not described here..

Definitions of the terms used in this work are provided in the *Glossary*. It is presumed this material will be of interest mainly to those familiar with American shape-note hymnody. Others whose concern is less direct may also be interested to examine the venerable tonality of this tradition; a tonality not only appropriate for present use, but, recognized for what it is, one still capable of dynamic future development. These tunes employ no fewer than fourteen modes, five of which admit two solmizations, reflecting further, more subtle, structural differences.

The method of the present study is based on that of George Pullen Jackson (1874-1953), which was founded on that devised by Cecil J. Sharp (1859-1924), who studied the relation between English folk song and its American descendants. Jackson states that his (and Sharp's) method of classification was devised to describe the melodies without any theoretical presuppositions. While accepting Jackson's premises, this study will attempt to discern the distribution of the variable characteristics described above, so to propose a more precise system for modal classification. The conclusions presented are *functional*, i.e. they regard the notes in relation to each other, rather than as discrete units within a given theoretical structure.

Both Jackson and Sharp observed that traditional melodies often have a pentatonic bias, i.e. they "prefer" the notes of the pentatonic scale (pentatones) over the semitones. There are five pentatonic modes (older usage, *species*), distinguished by which pentatone serves as the tonic. Sharp and Jackson identify which pentatonic scale predominates by the numbers 1 (*do*), 2 (*re*), 3 (*fa*), 4 (*sol*) or 5 (*la*). Both also observed that the pentatonic pitches are stable, while the pitch (either natural or flat) of the semitones may vary. Sharp used the letters a and b to represent the semitones, *mi* and *ti* respectively, regardless of pitch.

Jackson refined this system to indicate the natural pitches of *mi* and *ti* by upper case A and B, and their flat pitches by lower case a and b. For example, the familiar major scale on *do* would be represented as 1 A + B, and the minor scale on *la* as 5 A + B. These representations may appear the simplest and best for those modes, as they are possible using the white keys alone on a keyboard, without recourse to any of the black keys. Further observation, however, suggests that this may not always be the case. The fasola modality (and that of its trans-Atlantic precedents) is also more complex than the familiar major-minor system.

To begin with, five degrees remain on the white keys which can serve as the tonic of a diatonic scale, viz. *re*, *mi*, *fa*, *sol* and *ti*. The heptatonic scales with tonics other than *do* and *la* are sometimes and not altogether accurately referred to as the "Church modes". The latter properly are those defined in the Middle Ages by Guido of Arezzo, who identified four of the seven possible diatonic modes: Dorian, Phrygian, Lydian and Mixolydian. He further subdivided these by range, either authentic or plagal, affixing the prefix *Hypo-* to identify the latter. His work did indeed provide the foundation for subsequent modal theory. Guido's work was extended in the Renaissance by Glarean, who identified the remaining scales, Aeolian (tonic *la*), Locrian (*ti*) and Ionian (*do*), including their plagal versions. Both assumed, however, that the pitches of the semitones are also relatively stable, and admitted *ti* flat only as an occasional accidental, without changing the mode.

The situation is complicated when variation (either natural or flat, but not within the same melody) is admitted in the pitch of the semitones. This variability and the stable pitches of the pentatones observed by Sharp and Jackson were empirical conclusions, not mere hypotheses. For example, the major scale on *do* can also be represented as 3 A + b, i.e. *fa* + *mi*-natural and *ti* flat. Moreover, not only the Ionian, but the majority of the remaining heptatonic (as well of the hexatonic) modes contain more than one possible pentatonic scale, depending on which notes are identified as the semitones (see the *Modal Index*). Not only do these melodies prefer the pentatones over the semitones, but in these same melodies one pentatonic scale is usually more evident than the other(s). As indicated, this requires variance in the pitches assigned the semitones. The question is now why this pentatonic character exists and how it is determined.

It was remarked in the preceding paragraphs that the Ionian mode contains two possible pentatonic scales, on *do* and *fa*:

d r m f s 1 t d'

and

f s 1 t<sub>b</sub> d r m f'

These scales are *enharmonic*, occupying the same sequence of intervals.

In the first instance, however, the pentatones are:

d r f s 1 d' and in the second, they are f s 1 d r f'

Both scales are heptatonic Ionian, identified in the present study as dI7 and fI7, respectively. The former identifies the tonic as *do*, and that latter than as *fa*. This requires altering the pitch of one or both semitones, most often *ti*. Most melodies show a preference for one pentatonic scale rather than the other, and usually the pitch of the pentatones remains stable (except in certain minor pieces, for harmonic purposes). ut if the pentatones are regarded as stable, one of these scales must predominate. The question is how to determine which. An obvious place to start is the relative frequency of the notes concerned. In the *do* version, the semitones are on the third and seventh degrees, and in the *fa* version, they are on the fourth and seventh degrees. Using this criterion, the question is whether the third or fourth note of the scale is used more frequently in a given melody. Also, if a semitone is used as a passing tone, it may be “framed” by the neighboring pentatones, e.g. *fa-mi-re* or *la-ti-do*. Thus, figures or motifs of the predominant pentatonic scale may also be found; among these, it can be expected that the final cadence will be especially significant. The latter often consists of, is introduced by, or is otherwise built around the first three notes (authentic range, and usually in descending order) of the “preferred” pentatonic scale. For example:

dI7 SH1991: 310, WEEPING SAVIOR (Second)

s 1 s m f m f r d

fI7 SH1991: 311, SILVER STREET

R M f t<sub>b</sub> l s s f

Analogous differences can be observed between enharmonic minor melodies based on *re* and *sol*, respectively.

Omission of either semitone also leaves a gap of a minor third, and further narrows the choice of pentatonic scale. The latter is further specified by the omission of both semitones. Omission of one or both semitones constitutes a gapped scale.

A preliminary modal index of the 1991 *Sacred Harp* was compiled, following Jackson's system, and using the criteria described in the previous paragraph. The results follow:

1	=	6	2 A + b	=	63	4 a + b	=	17
1 A	=	9	3	=	66	5	=	1
1 b	=	4	3 A	=	53	5 A	=	1
1 A + B	=	22	3 b	=	76	5 A + b	=	2
1 A + b	=	2	3 A + b	=	159			
2	=	9	4	=	1	total	=	554
2 A	=	30	4 a	=	4			
2 b	=	9	4 b	=	20			

Several observations are necessary before proceeding to an interpretation of these data. First, only missing semitones were counted as gaps. The number of missing pentatones was insignificant except for the 6<sup>th</sup> degree of certain major scales. This is obvious in the case of major pentachords, which are regarded as hexatonic for the purposes of this study, as are minor pentachords. The 6<sup>th</sup> degree is also missing in some of the heptatonic Ionian scales; these omissions were not counted in the present survey. Also, in the case of whose melodies which contain more than one possible pentatonic scale, although in most instances one may be said to predominate, the issue is often ambiguous, and certain melodies can even be said of "modulate" between several pentatonic scales without changing mode. Identification of the pentatonic "base" is the only factor which requires a certain amount of prudential, if not subjective, judgment.

Although Jackson's premise seems sound (so to speak), the symbols he employs are somewhat arbitrary, and suggest that the semitones are somehow appendages to the pentatonic scale. The position of the semitone(s) in a scale will depend on which pentatonic scale is regarded as predominant. Indeed, among the twenty scales identified in the table above, the following sets of scales each occupy the same gamut of notes:

1 A , 3 b	1 A + B , 3 A + b	1 a + b , 2 A + B
2 A , 4 b	2 b , 5 A	2 A + b , 4 a + b

It is evident from the table shown three paragraphs above that the *mi* natural (A) and *ti* flat (b) are preferred in all scales except 1 A + B, 4 a and 4 a + b. I suggest that the explanation is likely functional or mnemonic rather than intentional, viz. that the semitones are perceived as dissonances, to be resolved in favor of a neighboring note. In the case of *mi* natural, this would be the following note, and *ti* flat would resolve to the preceding note. The question remains why the scales mentioned above are the exceptions.

3 A + b and 1 A + B both identify the common-practice major scale (Ionian)  
2 A + b and 4 a + b both identify the common-practice minor scale (Aeolian)

As conventional typesetting admits only the two common-practice modes, it may be that 1 A + b and 4 A + b, (especially the latter) were altered to conform to these norms.

In addition,

The major triad of the pentatonic scale is the tonic chord of mode 3 (pentatonic on *fa*).  
The minor triad of the pentatonic scale is the tonic chord of mode 2 (pentatonic on *re*).

Without endeavoring to explore the history of Western theory, the above would suggest a functional explanation for how these modes came to be preferred. Moreover, the pitches of the alternate scales may tend to be raised (1 b → B and 4 a → A) to conform with their more frequent counterparts. The question arises to what degree the singers "heard" ("hear") the written pitches, as fixed members of a set, or as intervals "shaded" relative to their context within a melody.

The tendency of traditional singers to “Dorianize” (raise the 6<sup>th</sup> degree of) certain minor tunes is well known, of which *Wondrous Love* (159) is the most conspicuous example. This would suggest that tunes based on pentatonic 4 (*sol*) are most likely do so, and in particular the hexatonic 4 a (A). Note (no pun intended) that this expresses a tendency rather than a requirement; in addition, it is not the only possible explanation, and also the tendency to raise the 6<sup>th</sup> may not be confined to those minor melodies of which the tonic is *sol*.

The conventional explanation is that these tunes were borrowed from the secular oral tradition and retain their archaic modality. This appears to be the case in certain instances. Another explanation has to do with the scale as a whole rather than the individual notes. As suggested by the German sociologist Max Weber, the question here is whether the octave is fully integrated, i.e. whether equal attention is given to each section of the scale. The octave comprises two diazeutic tetrachords. In the major (Ionian) scale, the two tetrachords are identical (half-step between 3 and 4), which facilitates movement between the lower and upper ranges in the scale. In common-practice minor (Aeolian), the tetrachords differ (the lower 2-3, and the upper 1-2). This transforms the full 8-note scale into a structural unit. The raised 6<sup>th</sup>, however transforms the minor scale into identical tetrachords (half-step between 2 and 3) superposed in a manner analogous to the Ionian. This latter, of course, would create a tension with the pentatonic triad on the tonic.

The functional explanations suggested here may help to explain the Dorian character of certain tunes in *The Sacred Harp* (and other early shape-note hymnals), although none of them amounts to a practical requirement.

A test of the *mi*-natural (4 A) theory may be the extent to which it is attested. Of Jackson's three anthologies, *Spiritual Folk Songs of Early America* (New York: 1937) seems the most pertinent. That book contains the following data:

2 A + B (Nos. 90, 144 and 249)

4 A Nos. 3, 23 and 50)

4 a (Nos. 51, 87 and 237; Jackson suggests a raised 6<sup>th</sup> for 51 and 87)

4 a + b (20, 22, 41, 42, 48; Jackson suggests a raised 6<sup>th</sup> for 20 and 41)

For seven of the eleven melodies in this book for which Jackson records or suggests a raised 6<sup>th</sup>, he identifies *sol* as the underlying pentatonic scale, and these seven are the majority of the twelve he identifies as containing both *sol* and *mi* (flat or natural). Thus Jackson provides support for the hypothesis that *mi*-natural is preferred (although not exclusively) to *mi*-flat. To represent this tendency, 4 a and 4 a + b are identified in this study as sm6 and sd7, respectively; the modal symbols are in lower case, m(ixolydian) and d(orian), to indicate that the 6<sup>th</sup> is printed as minor.

By confirming that all melodies require or prefer a single pentatonic scale, and that *mi* natural and *ti* flat are the preferred pitches for the semitones, it becomes possible to propose a modal system more specific than that used by Jackson. This is easily done for the heptatonic scales:

1 A + b = Mixolydian thus scales on *do* can be identified with this mode (abbreviated M)

2 A + b = Aeolian thus scales on *re* can be identified with this mode (abbreviated A)

3 A + b = Ionian thus scales on *fa* can be identified with this mode (abbreviated I)

4 A + b = Dorian thus scales on *sol* can be identified with this mode (abbreviated D)

5 A + b = Phrygian thus scales on *la* can be identified with this mode (abbreviated P)

Further abbreviate: *do* = d ; *re* = r ; *fa* = f ; *sol* = s ; and *la* = l ; thus the modal symbols become:

dM, rA, fI, sD, and lP ; add 7 to indicate a heptatonic scale = dM7, rA7, sD7 and lP7.

That the three elements of these symbols are separable helps to facilitate examination of each of what the three represent, and also to distinguish prudential judgments (in the case of the pentatonic bases) from hard data.

Application of these criteria to the pentatonic scales free of semitones produces these symbols:

dM5, rA5, fI5. SD5 and LP5. Jackson rightly observes that a number of melodies contain only a few occurrences of one or both semitones, and termed them “basically pentatonic”. For present purposes, those melodies containing only a single instance of one or both semitones are labeled basically pentatonic (abbreviated b.p.) in the *Modal Index*.

Before continuing, it may be advantageous to change the order in which the pentatonic scales are examined, from their sequential order in the *do* scale to the cycle of fifths, beginning with *fa*, followed by *do, sol, re* and *la*. This approach is acoustically “sound”, being generated by the harmonic series (overtones) which accompany the articulation of any note, in this context the tonic. (Note: the Pythagorean comma permits the first five notes (the pentatonics) to remain fairly true, but the pitches which follow become more ambiguous, beginning with *mi* (next), then *ti* et seqq. How the role of the semitones was rationalized in various traditions is explored by the German sociologist Max Weber. (The case can be made for dispersed harmony also being a product of the harmonic series, given the resonance of traditional singing environments, but that is outside the compass of the present study.)

This acoustic background may help to discuss the more complex question of classifying the hexatonic scales. Although five of the seven heptatonic modes are capable of more than one solmization, each heptatonic scale fits only one of Glarean's modes. The two remaining heptatonic scales admit only one solmization:

3 A + B (Lydian), and 5 a + b (Locrian)

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Examples of the first of these are rare, and Locrian is not found in the indigenous folk song of the British Isles, nor in American melodies descended from those traditions. In addition, the three Phrygian tunes found in *The Sacred Harp* (1991) seem as likely harmonic as melodic; of these, *Shawmut* (p. 535), a Lowell Mason production, looks like a four-part chordal setting printed in separate staves, and so resembles the earlier, often polyphonic, arrangements.

Four pairs, respectively, of the ten possible hexatonic scales occupy the same gamut. Each pair can belong to one of two modes, depending on the pitch assigned to the missing semitone. (Bronson calls these and the pentatonic scales “bridge” modes, for that reason.) Granted the tendency of the semitones to natural (*mi*) or flat (*ti*), however, the correspondences are represented as follows:

fI6 = dI6 ; dM6 = sM6 ; sD6 = rD6 ; and rA6 = 1A6

In the first of each pair, *ti* flat is the semitone, and in the second it is *mi* natural. The second of each pair would seem contrary to the mode indicated by its pentatonic base. The process follows a cycle of fourths (reverse of the cycle of fifths):

*la* (Phrygian) → Aeolian ; *re* (Aeolian) → Dorian ; *sol* (Dorian) → Mixolydian ; and *do* (Mixolydian) → Ionian ; following this pattern, in mode 3 A, *fa* (Ionian) → Lydian, and so is labeled fL6.

It is not suggested that these changes of mode are absolute, but rather that a tendency in that direction is introduced by analogy with the other pentatonic scale (hypothetical in the case of fL6), and that modal tension is avoided by omission of the other semitone, in each case B, or *ti* natural. In the instance of fL6 (3 A), this may seem counter-intuitive; melodies in that scale lack the exotic flavor provided by an augmented fourth. Even so, this classification seems required by the pattern of the evidence; at the least, it does provide a distinctive symbol for that scale. It can further be observed that, excluding the pentatonic identifiers, the modal system proposed in the present study does not depend on any preconceptions of modal theory, and that another set of symbols can be substituted, if desired, for those employed here, and used to discern other patterns of melodic activity.

## An Alphabetic Index of *The Sacred Harp* (1991)

**tune name** : that used in *The Sacred Harp* (1991 edition)

Tunes having the same name are distinguished in this manner:

variants of the same tune are indicated by capital letters in parentheses (A), (B) etc.; the term here indicates any difference in the variable characteristics examined in this study

different tunes with the same name are indicated by numbers in parentheses (1), (2) etc., and tunes sharing both qualities are indicated by letters and numbers (1A), (1B) etc.

**page** : the page number in *The Sacred Harp* (1991 edition)

**B** following a page number indicates bottom of page

**T** following a page number indicates top of page

**mode** : The system of modal description used in this study is described in the *Introduction*

**b.p.** : = basically pentatonic; in this study, indicates a single occurrence of one or both semitones

**low and high** : indicates the lower and upper limits of the melody's range; the numbers used are explained in the *Range Index*

**fuging** : indicates that the tune is fuging, i.e. contains a contrapuntal section, often the second half, and usually of voices entering in succession

**year** : the year of composition or first publication, as supplied in *The Sacred Harp* (1991)

## Alphabetic Index, cont.

Fasola Modality : *The Sacred Harp* (1991), page 07

tune name	page	mode	b.p.	low	high	fuge	year
Abbeville	033B	fL6		6	21		1844
Adoration	138T	fL6	b.p.	11	15		1869
Africa	178	fL7		11	23		1770
Ainslie	348T	sD6		5	17		1988
Akers	293	fL7		11	21	fuge	1935
Akin	472	fL7		5	15	fuge	1971
Alabama	196	rA7		11	23	fuge	1835
Albion	052T	fL6		5	15		1816
Alexander	393	fL6		11	21		1986
All Is Well	122	fL7		5	15		1844
All Saints New	444	rA7		3	15	fuge	1791
Amanda Ray	493	fL6	b.p.	11	21		1960
America	036T	rD6		5	17	fuge	1798
American Star, The	346	rA7		11	25		1850
Amity	150	fL7		7	15	fuge	1785
Amsterdam	084	dL6		5	16		1742
Animation	103	fL7		5	21		1835
Anthem on the Beginning	553	fL7		11	23	fuge	1950
Anthem on the Saviour	355	rD6		5	16		1850
Antioch	277	rA6	b.p.	11	21		1850
Arbacoochee	430	rD6		7	21	fuge	1908
Ark, The	506	rA7		7	21		1966
Arkansas	271T	rD6		7	17		1869
Arlington	073B	fL6		11	16		1762
Arnold	285T	fL6	b.p.	5	16		1850
As We Go On	488	fL7		11	21		1959
Assurance	091	fL7		7	21	fuge	1781
At Rest	499	fL5		11	23		1960
Aylesbury	028T	rA7		11	17		1718
Babel's Streams	126	rA7		2	13		1811
Babylon Is Fallen	117	rA7		11	22		1878
Ballstown	217	fL7		11	22	fuge	1809
Baptismal Anthem	232	fL7		5	16		1844
Beach Spring	081T	fL5		5	16		1844
Bear Creek	269	fL7		11	23	fuge	1778
Behold the Savior	292	fL7		11	21	fuge	1935
Bellevue	072B	fL5		5	15		1844
Beneficence	486	fL7		5	15		1786
Bethel	027	rD6		11	21		
Better Land, The	454	fL7		5	16	fuge	1935
Big Creek	494	fL6		11	21		1986

tune name	page	mode	b.p.	low	high	fuge	year
Bishop	420	fI6		11	21		1935
Blessed Lamb, The	054	dI7		4	14		
Blissful Dawning	550	fI7		11	22	fuge	1959
Blooming Youth	176B	fI5		5	15		1869
Bound for Canaan	082T	dM7	b.p.	11	21		1844
Bower of Prayer, The	100	fI7	b.p.	3	15		1844
Boylston	147T	dM7		6	14		1832
Bride's Farewell, The	359	fL6		3	15		1869
Bridgewater	276	fI7		6	14	fuge	1782
Bristol	468	fI7		11	21	fuge	1785
Burdette	422	fI7		11	21	fuge	1909
Burk	092	fI5		5	21		1844
Calvary	300	sd7		5	16	fuge	1785
Cambridge	287	dI7		5	14		1790
Can I Leave You?	385T	sD6		7	13		1859
Canaan's Land	101T	fI5	.	11	15		1844
Carmarthen	473	fI6		5	16		
Carnsville	109	fI5		5	16		1844
Chambers	120	fI7		11	24	fuge	1869
Charge to Keep, A	502	fI7		11	21		1950
Charlestown	052B	fI7		11	21		1799
Charlton	407	fI7		11	23		1859
Chester	479	fI7		11	21		1770
Cheves	432	fI7	b.p.	11	23	fuge	1857
Child of Grace, The	077T	rD6		4	15		1844
China	163B	fL6		3	13		1801
Christ Our Song	386	fI6		11	21	fuge	1935
Christian Soldier	057	fI7		6	21		1835
Christian Song	240	sd7		3	15		1805
Christian Warfare, The	179	dM6	b.p.	11	21		1835
Christian's Delight	429	sd7		7	21		1859
Christian's Flight, The	177	fI7		11	21		1866
Christian's Hope	206	fI7	b.p.	11	21		1907
Christian's Hope, The	134	fI6		5	21		1835
Christian's Nightly Song, The	416	rA7		11	21		1859
Christian's Farewell	347	fI7		5	15		1989
Christmas Anthem	225B	fI6		5	21		1844
Church's Desolation, The	089	dM5		11	21		1844
Clamanda	042	rA7		7	22		
Claremont	245	sd7		5	21		1799
Cleburne	314	fL6		5	21		1908

tune name	page	mode	b.p.	low	high	fuge	year
Cobb	313B	rA7		11	16		1971
Columbiana	056T	f15		3	15		1850
Columbus	067	rA5		11	21		1829
Complainier	141	fL6	b.p.	5	21		1835
Concord	313T	f17		5	15		1793
Confidence	270	f17		3	16		1850
Consecration	448T	sD6		11	21		1866
Consolation	367	rA7		11	21		1935
Conversion	297	f17		5	15	fuge	1794
Converted Thief, The	044	dM6		6	21		1825
Converting Grace	230	dI7		5	15		1859
Cookham	081B	f16	b.p.	11	16		1760
Corinth	032T	f16		11	21		1844
Corley	510	f17		5	15		17th c.
Coronation	063	f16		5	16		1793
Coston	382	f16		11	21		1935
Cowper	168	rD6		7	21	fuge	1803
Cross for Me, A	349	rA7		7	23	fuge	1935
Cross of Christ	123B	sd7		5	17		1844
Cuba	401	fL6	b.p.	5	15		1859
Cusseta	073T	dM5		11	21		1844
Dartmouth	169	f17		11	22		1803
David's Lamentation	268	sD6		7	15		1778
Day of Worship	060	f15		6	21		1848
Delight	216	rA7		11	23	fuge	1798
DeLong	516	f15		11	21		1985
Desire for Piety	076B	f15		3	15		1844
Detroit	039T	rA6		7	21		1820
Devotion	048T	f15		5	13		1818
Distress	032B	rA5		7	21		1835
Doddridge	263	f17		7	16		1869
Done With the World	088T	f15		11	22		1844
Duane Street	164	dI7		5	15		1835
Dull Care	098	dI6		5	15		1844
Dura	531	f16		11	21		1959
Dying Boy, The	399	fL6	b.p.	11	21		1859
Dying Californian, The	410T	fL6	b.p.	5	15		1859
Dying Christian, The	123T	f16	b.p.	5	21		1844
Dying Friend, The	399T	rA6	b.p.	7	21		1935
Dying Minister, The	083B	fL6	b.p.	6	21		1854

tune name	page	mode	b.p.	low	high	fuge	year
Easter Anthem	236	fI6		11	16		1787
Easter Morn	415	fI7		5	15		1988
Ecstasy	106	rA5		7	21		1844
Edgefield	082B	sd7		7	21		1844
Edmonds	115	rA7		11	23		1869
Edom	200	fI7		11	21	fuge	1797
Elder	450	dI7		5	23		1869
Elysian	139	fI7		11	22		
Emmaus	569T	dI7		11	21		1975
Enfield	184	fI7		11	23		1785
Enquirer, The	074T	sm6		5	21		1844
Essay	157	fI7		2	14		1840
Ester	037T	fI5		11	21		1869
Eternal Day	383	rD6		3	13	fuge	1859
Eternal Home	336	fI7		11	21	fuge	1911
Eternal Light	483	fI6		11	21	fuge	1960
Eternal Praise	377	rA7		7	23	fuge	1935
Evening Shade	209	rA7		7	21	fuge	1805
Exhilaration	170	fL6		6	21		1844
Exhortation (First)	171	fI7		11	22	fuge	1796
Exhortation (Second)	272	sD6		5	17	fuge	1800
Exit	181	rA7		11	23	fuge	1808
Expression	125	rA7		3	15		
Fairfield	029T	sD6		5	15		
Faith and Hope	462	fL6		7	21		1959
Family Bible	165	rA7		5	21		
Family Circle	333	fI7		7	16		1850
Farewell Anthem	260	sd7		5	17	fuge	1789
Farewell to All (First)	069B	rD6	b.p.	5	17		1859
Farewell to All (Second)	570	fI5		11	21		1985
Fatherland	449	dI6		5	21		1855
Federal Street	515	fI7		7	16		1832
Fellowship	330B	rA7		11	21		1935
Few Happy Matches	096	fI7		5	16		1844
Fight On	385T	rD6		7	23		1859
Fillmore	434	fL6		11	21	fuge	1869
Fleeting Days	348B	fI6	b.p.	11	21		1869
Florence	121	fI5		11	23		1844
Florida	203	rD6		7	21	fuge	1803
Fountain, The	397	rA7		11	21	fuge	1935
Fredericksburg	389	fI6		5	21		1935

tune name	page	mode	b.p.	low	high	fuge	year
Friendship	458	sD6		5	21		1869
Frozen Heart	093	fL6	b.p.	11	23		1844
Fulfilment	102	rA7		7	21		1844
Funeral Anthem	320	rA7		11	21		1778
Funeral Thought	158	fL6		11	23		1837
Gainsville	070T	dI6		11	16		1869
Garden Hymn	284	fI5		5	21		1826
Georgia	197	rA7		11	23	fuge	1935
Glad New Song, A	530	fI7		11	21	fuge	1959
Golden Harp, The	274T	rA5		7	21		1869
Golden Streets	425	fL6	b.p.	5	15		1859
Good Old Way, The	213T	fI5		11	23		1835
Gospel Pool, The	034T	fI5		11	23		1869
Gospel Trumpet	099	fI7		5	15	fuge	1844
Grantville	423	rA7	b.p.	11	21	fuge	1859
Granville	547	rA7		11	23		1986
Great Day, The	567	sD6		5	15		1859
Great Redeemer	511	fI6		11	15	fuge	1959
Green Fields	127	fI6		5	16		
Green Street	198	fI7		5	16	fuge	
Greenland	301	fI7		11	23		1867
Greensborough	289	fI5		6	21		1850
Greenwich	183	rA7		11	22	fuge	1785
Grieved Soul, The	448B	fI6		11	15		1859
Hallelujah	146	dM6	b.p.	11	21		1835
Hampton	538	fI7		5	16	fuge	1806
Happy Christian	399B	rA5		7	17		1935
Happy Home	343	fI6	b.p.	5	15		1859
Happy Land	354B	fI5		11	21		1850
Happy Sailor, The	388	fI6		5	16		1859
Harmony	172	fI7		5	21	fuge	1805
Harpeth Valley	573	fI7		11	21	fuge	1966
Haynes Creek	466	fI7		11	21	fuge	1988
Heaven's My Home	119	fL6	b.p.	11	21		1869
Heavenly Anthem	518	fI7		11	22		1950
Heavenly Armor	129	dM5		11	21		1828
Heavenly Dove	371	fI6		11	15	fuge	1859
Heavenly Home	286	rA7		11	21	fuge	1935
Heavenly Land	303	fI6	b.p.	11	21		1987
Heavenly Port, The	378T	fI6		11	15		1859

tune name	page	mode	b.p.	low	high	fuge	year
Heavenly Rest	403	fI5		11	23		1869
Heavenly Union	484	fI6	b.p.	5	22		1989
Heavenly Vision	250	dI7		5	21	fuge	1786
Hebrew Children	133	lA6	b.p.	6	16		1844
Hebron	566	fI7		3	14		1823
Help Me To Sing	376	rA5		5	17		1859
Highlands of Heaven	175	fI5		11	23		1869
Hill of Zion, The	565	dI6		5	15		1859
Holcombe	077B	fL6		5	13		1986
Holiness	076T	fI6	b.p.	11	21		1844
Holly Springs	453	rA7		11	21	fuge	1935
Holy City	101B	rA6	b.p.	7	21		1844
Holy Manna	059	fI5		5	15		1825
Home in Heaven	041	fI7		7	23		1869
Home of the Blest	541	fI6		11	21		1959
Homeward Bound	373	fI7		5	16		1935
Horton	330T	rD6		11	21		1935
Humility	050B	fI7		3	13		1988
Huntington	193	fI7		5	16	fuge	1790
I Want to Go to Heaven	568	fI6		11	16		1959
I Would See Jesus	075	fI5		11	23		1867
I'll Seek His Blessings	542	rA7		5	17	fuge	1959
I'm Going Home	282	fI5		11	23		1850
I'm On My Journey Home	345B	sD6		7	21		1859
Idumea	047B	rA5		5	17		1816
Imandra New	045B	fI6	b.p.	11	23		1835
Immensity	315	rA7		5	17	fuge	1806
Infinite Day	446	fI7		11	21		1936
Infinite Delight	562	lP7		6	16	fuge	1959
Invitation	327	fI7		11	24	fuge	1784
Invocation (First)	131B	fI6		5	16		1835
Invocation (Second)	492	fI7		5	15		1982
Irwinton	229	fI5		11	23		1844
Jackson	317	fI5		11	21		1908
Jacob's Vision	551	fI7		5	16	fuge	1959
Jasper	426B	fI7		11	21	fuge	1907
Jefferson	148	sD6		4	15		1818
Jerusalem	053	sD6		5	17	fuge	1835
Jester	331	fI5		5	16		1908
Jesus Is My Friend	345T	fL6	b.p.	11	21		1869

tune name	page	mode	b.p.	low	high	fuge	year
Jesus Rose	156	fI7		11	23		1869
Jewett	105	fI6	b.p.	11	21		1869
Jordan (First)	066	dI7		5	16		1786
Jordan (Second)	439	fI7		11	21	fuge	1908
Journey Home	111T	fI5		11	16		1868
Joyful	513	fI7		5	15		1844
Jubilee	144	fI6		5	16		1820
Kedron	048B	rA7		11	22		1799
Kelley	426T	fI5		11	21		1908
King of Peace	074B	sD6		5	15		1835
Kingwood	266	fL6		5	15		1820
Laban	147B	fI7		3	13		1830
Lamb of God, The	572	fI7		7	21		1966
Land of Rest	285B	fI5		11	23		1850
Last Words of Copernicus	112	fL6		11	21	fuge	1869
Lawrenceburg	380	fI7		11	21	fuge	1935
Leander	071	sd7		5	15		1818
Lebanon	354T	fL6	b.p.	5	13		1980
Lena	210	sd7		7	21		1795
Lenox	040	fL6		5	15	fuge	1782
Let Us Sing	046	fI6		11	16		1867
Liberty	137	fI7		11	22	fuge	1800
Lisbon	467	fI6		5	15		1785
Liverpool	037B	fL6	b.p.	11	21		1835
Living Hope	500	rA7		11	21		1959
Living Lamb	309	dI7		11	24		1850
Living Streams	558	fI6		11	21	fuge	1959
Lloyd	503	dI7		11	21		1980
Logan	302	rA7		11	23	fuge	1908
Lone Pilgrim, The	341	fL6	b.p.	11	23		1850
Long Sought Home	235	fL6		5	15		1847
Look Out	090	fL6		5	21		1844
Lord, We Adore Thee	477	fI6		2	13		1960
Louisiana	207	dM5		11	21		1835
Love Divine	030T	fI7		5	15		1869
Love Shall Never Die	278T	rD6		7	21		1987
Love the Lord	375	rD6		11	21		1859
Loved Ones, The	413	fI7		5	15		1859
Lovely Story, The	104	fI6		5	15		1844
Lover of the Lord	124	fI6		6	14		1869

tune name	page	mode	b.p.	low	high	fuge	year
Loving Jesus	361	dI7		7	21		1850
Loving-Kindness	275T	sD6		5	15		1850
Majesty	291	fI7		11	21		1778
Man's Redemption	322	fI7	b.p.	11	21		1869
Manchester	392	fI7		11	21	fuge	1935
Marcellas, The	405	fI6		11	21		1859
Marlborough	228	fI7		5	15	fuge	1793
Marriage in the Skies, The	438	fI7		11	21		1909
Mars Hill	517	fI7		11	21	fuge	1959
Martin	452	fI6		11	16		1836
Mary's Grief and Joy	451	dI7		11	22		1869
McGraw	353	fI7		11	21	fuge	1971
McKay	433	rA7		5	16	fuge	1908
Mear	049B	fI6		11	16		1720
Melancholy Day	419	rD6		7	23	fuge	1859
Mercy Seat, The	470	fI6		11	21	fuge	1960
Mercy's Free	337	fI5		5	21		1858
Messiah	131T	rA6	b.p.	7	21		1821
Messiah's Praise, The	394	fI6		3	11		1869
Midnight Cry, The	495	dM5		11	22		1835
Milford	273	fI6		5	16	fuge	1760
Millennium	130	fI6		11	23		1831
Minister's Farewell	069T	fL6		5	21		1813
Mission	204	fI5		5	21		1835
Monroe	370	rD6		7	17		1850
Montgomery	189	fI7		3	15	fuge	1790
Morality	136	dI7		5	16		
Morgan	304	fI7		7	23	fuge	1802
Morning	163T	rA7		11	21	fuge	1799
Morning Prayer	411	rA7		11	21	fuge	1935
Morning Sun	436	fI7		11	21	fuge	1911
Morning Trumpet, The	085	rD6		11	21		1844
Mortality	050T	rA7		11	21		1785
Mount Desert	474	fI6		11	16	fuge	1985
Mount Pleasant	218	fI7		11	22	fuge	1793
Mount Vernon	110	rA7		11	23	fuge	1799
Mount Zion (First)	220	fI7		11	25	fuge	1792
Mount Zion (Second)	088B	fI6	b.p.	11	21		1844
Mulberry Grove	482	fI5		5	15		1869
Mullins	323T	fL6		11	21		1869
Murillo's Lesson	358	fI7		5	21		

tune name	page	mode	b.p.	low	high	fuge	year
Mutual Love	410B	f15		6	23		1835
My Brightest Days	546	f17		5	14	fuge	1959
My Home (First)	051	rA7		11	23		1869
My Home (Second)	560	f16		5	21		1959
My Life and Breath	527	f17		11	21	fuge	1959
My Rising Sun	478	f17		11	21	fuge	1960
My Shepherd Guides	490	f16	b.p.	11	21		1959
Nashville	064	fL6		3	15		1821
Natick	497	f17		5	15		1989
Nativity	350	f17		5	16		1988
Never Part	094	dI7		11	22		1850
Never Turn Back	378B	rD6		5	17		1869
New Agatite	485	f17		11	22	fuge	1990
New Bethany	431	dI7		11	22	fuge	1869
New Bethel	395	f17		11	21	fuge	1935
New Britain	045T	f15		5	15		1829
New Georgia	534	f17		11	21	fuge	1959
New Harmony	406	f15		5	21		1859
New Hope	316	f16	b.p.	11	21	fuge	1908
New Hosanna	412	f17		3	16		1859
New Jerusalem	299	f17		11	21	fuge	1796
New Jordan	442	sd7		11	25	fuge	1815
New Lebanon	202	f17		11	24	fuge	1808
New Prospect	390	f15		5	21		1866
New Topia	215	rA7		11	23		1816
Newburgh	182	f17		3	15		1798
Newnan	321	f15		11	21		1859
Nidrah	540	f17		5	15		1982
Ninety-Fifth	036B	f16		11	15	fuge	1813
Ninety-Third Psalm	031T	fL6	b.p.	5	15		1812
North Port	324	sD6		5	15		1850
North Salem	440	rA7		11	22	fuge	1799
Northfield	155	f17		3	15	fuge	1800
Norwich	362	f17		5	16	fuge	1850
Notes Almost Divine	396	rA7		11	21	fuge	1935
Novakoski	481	rA7		11	23	fuge	1989
O Come Away	334	f17		2	13		1848
O'Leary	501	f17		11	22		1990
Ocean	222	f17		11	21	fuge	1787
Ode of Life's Journey	227	f17		5	21		1844

tune name	page	mode	b.p.	low	high	fuge	year
Ode on Science	242	fI7		11	23		1798
Odem (First)	295	fI6		11	21		1935
Odem (Second)	340	fI7		11	21	fuge	1935
Ogletree	138B	fI5		11	21		1869
Oh, Sing With Me!	374	fL6		11	21		1859
Oh, What Love	491	fI5		3	16		1960
Old Hundred	049T	fI7		5	15		1551
Old Ship of Zion, The	079	fI5		11	21		1844
Old-Fashioned Bible, The	342	fL6		5	22		1850
Olney	135	fI7		5	21		1818
Ortonville	068B	fI6	b.p.	5	15		1837
Our Humble Faith	463	fI7		11	21		1959
Oxford	306	fI7		5	16	fuge	1850
Panting for Heaven	384	fI7		11	23	fuge	1869
Parting Friend	414	fL6		11	21		1859
Parting Friends (First)	267	rA6		7	21		1842
Parting Friends (Second)	308	lP7		4	14		1850
Parting Friends (Third)	521	fI7		11	21		1959
Parting Hand	062	fI5		11	21		
Passing Away	445	fL6		5	13		1872
Peace and Joy	532	fI7		11	22	fuge	1959
Penick	387	fI6	b.p.	11	21		1857
Penitence	571	fI7		5	15		1966
Petersburg	174	fI7		11	25		1786
Phillips Farewell	549	fL6		3	13		1962
Phoebus	173	sd7		11	21		1770
Pilgrim	201	rA6		7	21		1820
Pilgrim's Farewell	185	fI7		11	21		1802
Pilgrim's Way, The	545	rD6	b.p.	7	21		1959
Pisgah	058	fL6		3	16		1817
Pittsford	351	fI7		5	14	fuge	1809
Pleasant Hill	205	fI5		11	23		1820
Plenary	162	fI5		5	21		1839
Pleyel's Hymn (First)	143	dI6		11	21		
Pleyel's Hymn (Second)	523	dI7		5	15		
Poland	086	rA7		3	13		1785
Portland	556	fI7		11	22	fuge	1802
Portuguese Hymn	223	fI7		5	15		1743
Praise God	328	rD6	b.p.	5	21		1911
Praise Him	544	fI5		5	21		1960
Pray, Brethren, Pray	167	fI7		11	21		1845

tune name	page	mode	b.p.	low	high	fuge	year
Present Joys	318	fI7		11	21	fuge	1908
Primrose	047T	fI6		5	15		1812
Primrose Hill	043	fI6		11	21		
Prodigal Son, The	113	dI7		5	15		1844
Promised Day	409	fI5		11	21		1859
Promised Land, The	128	sD6		11	21		1835
Prospect	030B	fI5		5	16		1835
Protection (1)	187	fI7		11	22	fuge	1808
Protection (Second)	402	fI7		11	22		1869
Providence	298	fI5		5	16		1820
Ragan	176T	fL6		11	21		1869
Rainbow	344	fI7		3	14	fuge	1785
Raymond	441	fI6		11	22	fuge	1855
Redemption	480	fI6		11	21		1959
Rees	418	fL6		5	13		1859
Religion is a Fortune	319	fI6	b.p.	5	16		1850
Repentance	214	sd7		7	21	fuge	1796
Rest for the Weary	154	fI7		3	13		1869
Restoration (First)	312B	rA5		5	17		1835
Restoration (Second)	271B	fL6		11	22		1850
Resurrected	153	fI5		11	21		1908
Resurrection Day, The	498	fL6		11	23		1959
Return Again	335	fL6		6	21		1850
Reverential Anthem	234	fI7		5	16		1844
Reynolds	225T	fI6	b.p.	11	15		1985
Rock That Is Higher Than I, The	496	fI7		5	15		1869
Rockport	372	rA7		7	23	fuge	1989
Rocky Road	294	fI5		5	21		1935
Roll Jordan	274B	fI5		11	21		1855
Roll On	275B	fL6		11	23		1850
Rose of Sharon	254	dI7		5	16		1778
Royal Band, The	360	sD6	b.p.	7	23		1850
Russia	107	sD6		7	15	fuge	1786
Sabbath Morning	283	fI7		11	21	fuge	1935
Sacred Mount	456	fI7		11	21		1935
Sacred Rest	435	fI6		11	21		1869
Sacred Throne	569B	fI6	b.p.	5	15		c. 1824
Saint's Delight, The	114	sd7		7	21		1835
Saints Bound for Heaven, The	035	fL6		5	16		1840
Salem	068T	sd7		3	15		1817

tune name	page	mode	b.p.	low	high	fuge	year
Samaria	026	rD6		11	21		1936
Sardinia	296	rA7		2	13		1794
Sardis	460	fI7		5	15	fuge	1869
Save, Lord, or We Perish	224	rA7		11	21	fuge	1869
Save, Mighty Lord	070B	rA5		7	21		1854
Savior's Call, The	489	fI6		11	16		1869
Savior's Name, The	471	fI5		11	21		1960
Sawyer's Exit	338	fL6	b.p.	5	21		1850
Schenectady	192	fI7		11	22	fuge	1805
Send a Blessing	369	fI7		5	16		1859
Sermon on the Mount	507	fI7		3	13		1959
Service of the Lord	080B	fI6	b.p.	11	21		1844
Sharon	212	fI7		5	15	fuge	1793
Sharpsburg	039B	fI5		3	13		1869
Shawmut	535	lP5		3	14		
Shepherd's Flock, The	279	fI7		11	21	fuge	1935
Shepherds Rejoice	152	fI5		11	23		1850
Sheppard	464	fI7		11	22	fuge	1990
Sherburne	186	fI6		11	23	fuge	1783
Shining Star	461	dI7		5	21		1988
Shouting Song	080T	sd7		11	16		1844
Showers of Blessings	528	fI7		5	15	fuge	1959
Sidney	437	fI5		11	23		1908
Silver Street	311	fI7		11	24		1780
Sing On	381	fI5		11	21		1935
Sing to Me of Heaven!	312T	rD6		5	17		1850
Sinner's Friend	132	rD6		11	21		1869
Sister's Farewell	055	fI5		11	21		1905
Soar Away	455	rA7		4	13	fuge	1935
Soft Music	323B	fI7		7	16		1850
Soldier of the Cross	325	fI7		11	21		1909
Soldier's Delight	487	rA7		11	21		1918
Sons of Sorrow	332	sd7		7	22		1848
Sounding Joy	391	fI7		11	22	fuge	1790
Southwell	365	fI7		11	23	fuge	1786
Span of Life	379	rA7		7	21		1869
Spirit Shall Return, The	512	fL6		5	16		1959
Spring	188	fI7		5	21		
St. Thomas	34B	fI6		5	16		1770
Stafford	078	dI6		5	15	fuge	1782
Still Better	166	fI5		5	13		1869
Stockwood	118	rD6		5	15		1869

tune name	page	mode	b.p.	low	high	fuge	year
Stony Point	368	fI7		5	21		1990
Stratfield	142	rA7		11	21	fuge	1786
Struggle On	400	fL6	b.p.	11	23		1859
Supplication	539	rD6		7	21		1959
Swanton	352	fI7		11	24	fuge	1809
Sweet Affliction	145B	fI6		11	16		1823
Sweet Canaan	087	dI6		11	21		1844
Sweet Home	161	dI7		11	21		1840
Sweet Majesty	536	rA7		7	23	fuge	1959
Sweet Morning	421	rD6	b.p.	11	23		1859
Sweet Prospect	065	sD6	b.p.	7	21		1833
Sweet Rivers	061	fI7		11	21		1825
Sweet Solitude	140	fI7		5	21		1835
Sweet Union	424	dI6		11	23		1859
Symphony	151	fI7		11	22		1790
Thankful Heart, A	475	fL6	b.p.	5	15	fuge	1989
Thou Art God	543	fI7		11	23	fuge	1959
Thou Art Passing Away	231	fI7		6	16		
Throne of Grace, The	476	fI6		11	21		1960
To Die No More	111B	fI5		11	15		1856
Tolling Bell	459	fI5		11	15		1868
Traveler, The	108B	rA6	b.p.	7	17		1868
Traveling On	208	fI7		11	21	fuge	1911
Traveling Pilgrim	278B	sm6		7	16		1850
Tribulation	029B	rD6		3	14		1813
Trumpet, The	149	fI7		3	14		1831
Turn, Sinner, Turn	160B	rA7		11	23		1844
Twenty-third Psalm, The	524	fI7		11	21		1950
Union	116	rA7		4	16		1844
Vain World Adieu	329	fI5		6	21		1856
Vale of Sorrow	083T	rA7		5	15		1844
Vermont	180	rA7		11	23		1778
Vernon	095	rD6		11	23		1813
Victoria	290	fL6		5	16		1850
Villulia	056B	sD5		7	21		1850
Virginia	191	rA7		11	21		1782
War Department	160T	sm6		11	21		1835
Warning	213B	fI6	b.p.	2	15		1869

tune name	page	mode	b.p.	low	high	fuge	year
Warrenton	145T	fL6	b.p.	11	21		1835
Wayfaring Stranger	457	rD6	b.p.	7	21		1935
We'll Soon Be There	097	fI5		11	15		1859
Weary Pilgrim	326	sD6		7	22		1850
Weary Souls, The	072T	fI5		11	23		1844
Webster	031B	fL6	b.p.	11	21		1835
Weeping Mary	408	fL6		3	13		1859
Weeping Pilgrim	417	dM5		11	21		1859
Weeping Savior (First)	033T	rD6		7	21		1844
Weeping Savior (Second)	310	dI7		7	21		1869
Weeping Sinners	108T	fI5		5	15		1868
Wells	028B	dI7		11	21		1724
Westford	280	fI7		5	16		1785
When I Am Gone	339	fI6		5	16		1850
Where Ceaseless Ages Roll	505	sD6		5	15	fuge	1959
Where There's No Trouble and Sorrow	465	fI7	b.p.	6	21		1960
White	288	dM6		5	16		1856
Whitestown	211	sd7		11	22	fuge	1800
Windham	038B	rA7		11	21		1785
Winter	038T	fI7		7	21		1785
Wondrous Cross	447	rA7		11	21	fuge	1932
Wondrous Love	159	sm6		7	21		1840
Wood Street	504	rA6		11	21	fuge	1986
Wootten	548	fI6		11	21		1976
Worcester	195	fI7		11	22	fuge	1778
World Unknown	428	rA7		7	21	fuge	1859
Ye Heedless Ones	522	rA7		7	21	fuge	1959
Youth will soon be Gone	404	fI6		11	21		1859
Zion	564	rA7		11	23	fuge	1959

# A Modal Index

## of *The Sacred Harp* (1991)

**NB:** Only the tenor line of fuging tunes is analyzed in this study, whether or not it constitutes a complete melody. Also, accidentals were not regarded in the determination of mode, except when they apply to the majority of a given note within a melody.

**mode** : The system of modal description used in this study is described in the *Introduction*

**b.p.** : = basically pentatonic; in this study, indicates a single occurrence of one or both semitones

**low** and **high** : indicates the lower and upper limits of the melody's range;  
the numbers used are explained in the *Range Index*

**fuge** : indicates that the tune is fuging, i.e. contains a contrapuntal section,  
often the second half, and usually of voices entering in succession

**page** : the page number in *The Sacred Harp* (1991 edition)

**B** following a page number indicates bottom of page

**T** following a page number indicates top of page

**tune name** : that used in *The Sacred Harp* (1991 edition)

Tunes having the same name are distinguished in this manner:

variants of the same tune are indicated by capital letters in parentheses (A), (B) etc.;  
the term here indicates any difference in the variable characteristics examined in this study

different tunes with the same name are indicated by numbers in parentheses (1), (2) etc.,  
and tunes sharing both qualities are indicated by letters and numbers (1A), (1B) etc.

**other** : unusual characteristics, mostly a final on other than the tonic

Following is a key to the possible solmizations of the modes; on the right  
is the number of times each occurs in *The Sacred Harp* (1991 edition).  
Press each mode to locate its section in this Index.

## Key to the Modes with their Solmizations

hexatonic Lydian	fL6	f s 1 d r m f	53
pentatonic Ionian	fI5	f s 1 d r f	66
hexatonic Ionian	fI6	f s 1 tb d r f	76
hexatonic Ionian	dI6	d r m f s 1 d'	9
heptatonic Ionian	fI7	f s 1 tb d r m f	159
heptatonic Ionian	dI7	d r m f s 1 t d'	22
pentatonic Mixolydian	dM5	d r f s 1 d'	6
hexatonic Mixolydian	dM6	d r f s 1 tb d'	4
hexatonic mixolydian	sm6	s 1 d r mb f s'	4
heptatonic Mixolydian	dM7	d r m f s 1 tb d'	2
pentatonic Dorian	sD5	s 1 d r f s'	1
hexatonic Dorian	sD6	s 1 tb d r f s'	20
hexatonic Dorian	rD6	r m f s 1 d r'	30
heptatonic dorian	sd7	s 1 tb d r mb f s'	17
pentatonic Aeolian	rA5	r f s 1 d r'	9
hexatonic Aeolian	rA6	r f s tb d r'	9
hexatonic Aeolian	lA6	l d r m f s l'	1
heptatonic Aeolian	rA7	r m f s 1 tb d r'	63
pentatonic Phrygian	lP5	l d r f s l'	1
heptatonic Phrygian	lP7	l tb d r m f s l'	2

total = 554

## Summary of Modal Data

f = 354	63.9%	L = 53	9.6%	5 = 83	15.0%
d = 43	7.8%	I = 332	59.9%	6 = 206	37.2%
s = 42	7.6%	M = 16	2.9%	7 = 265	47.8%
r = 111	20.0%	D = 68	12.3%		
1 = 4	.7%	A = 82	14.8%		
		P = 3	.5%		

mode	b.p.	low	high	fuge	page	tune name	other
fL6		6	21		033B	Abbeville	
fL6	b.p.	5	16		285T	Arnold	
fL6		3	15		359	Bride's Farewell, The	
fL6		3	13		163B	China	
fL6		5	21		314	Cleburne	
fL6	b.p.	5	21		141	Complainer	
fL6	b.p.	5	15		401	Cuba	
fL6	b.p.	11	21		398	Dying Boy, The	
fL6	b.p.	5	15		410T	Dying Californian, The	
fL6	b.p.	6	21		083B	Dying Minister, The	
fL6		6	21		170	Exhilaration	
fL6		7	21		462	Faith and Hope	
fL6		11	21	fuge	434	Fillmore	final on 15
fL6	b.p.	11	23		093	Frozen Heart	
fL6		11	23		158	Funeral Thought	
fL6	b.p.	5	15		425	Golden Streets	
fL6	b.p.	11	21		119	Heaven's My Home	
fL6		5	13		077B	Holcombe	
fL6	b.p.	11	21		345T	Jesus Is My Friend	
fL6		5	15		266	Kingwood	
fL6		11	21	fuge	112	Last Words of Copernicus	
fL6	b.p.	5	13		354T	Lebanon	
fL6		5	15	fuge	040	Lenox	
fL6	b.p.	11	21		037B	Liverpool	
fL6	b.p.	11	23		341	Lone Pilgrim, The	final on 21
fL6		5	15		235	Long Sought Home	
fL6		5	21		090	Look Out	
fL6		5	21		069T	Minister's Farewell	final on 21
fL6		11	21		323T	Mullins	
fL6		3	15		064	Nashville	
fL6	b.p.	5	15		031T	Ninety-Third Psalm	
fL6		11	21		374	Oh, Sing With Me!	
fL6		5	22		342	Old-Fashioned Bible, The	
fL6		11	21		414	Parting Friend	final on 21
fL6		5	13		445	Passing Away	
fL6		3	13		549	Phillips Farewell	
fL6		3	16		058	Pisgah	final on 21
fL6		11	21		176T	Ragan	
fL6		5	13		418	Rees	
fL6		11	22		271B	Restoration (Second)	
fL6		11	23		498	Resurrection Day, The	
fL6		6	21		335	Return Again	

mode	b.p.	low	high	fuge	page		other
fL6		11	23		275B	Roll On	
fL6		5	16		035	Saints Bound for Heaven, The	
fL6	b.p.	5	21		338	Sawyer's Exit	
fL6		5	16		512	Spirit Shall Return, The	
fL6	b.p.	11	23		400	Struggle On	
fL6	b.p.	5	15	fuge	475	Thankful Heart, A	
fL6		5	16		290	Victoria	
fL6	b.p.	2	15		213B	Warning	
fL6	b.p.	11	21		145T	Warrenton	
fL6	b.p.	11	21		031B	Webster	
fL6		3	13		408	Weeping Mary	
fI5		11	23		499	At Rest	
fI5		5	16		081T	Beach Spring	
fI5		5	15		072B	Bellevue	
fI5		5	15		176B	Blooming Youth	
fI5		5	21		092	Burk	
fI5	.	11	15		101T	Canaan's Land	
fI5		5	16		109	Carnsville	
fI5		3	15		056T	Columbiana	
fI5		6	21		060	Day of Worship	
fI5		11	21		516	DeLong	
fI5		3	15		076B	Desire for Piety	
fI5		5	13		048T	Devotion	
fI5		11	22		088T	Done With the World	
fI5		11	21		037T	Ester	
fI5		11	21		570	Farewell to All (Second)	
fI5		11	23		121	Florence	
fI5		5	21		284	Garden Hymn	
fI5		11	23		213T	Good Old Way, The	
fI5		11	23		034T	Gospel Pool, The	
fI5		6	21		289	Greensborough	
fI5		11	21		354B	Happy Land	
fI5		11	23		403	Heavenly Rest	
fI5		11	23		175	Highlands of Heaven	
fI5		5	15		059	Holy Manna	
fI5		11	23		075	I Would See Jesus	
fI5		11	23		282	I'm Going Home	
fI5		11	23		229	Irwinton	
fI5		11	21		317	Jackson	
fI5		5	16		331	Jester	
fI5		11	16		111T	Journey Home	

mode	b.p.	low	high	fuge	page	tune name	other
fl5		11	21		426T	Kelley	
fl5		11	23		285B	Land of Rest	
fl5		5	21		337	Mercy's Free	
fl5		5	21		204	Mission	
fl5		5	15		482	Mulberry Grove	
fl5		6	23		410B	Mutual Love	
fl5		5	15		045T	New Britain	
fl5		5	21		406	New Harmony	
fl5		5	21		390	New Prospect	
fl5		11	21		321	Newnan	
fl5		11	21		138B	Ogletree	
fl5		3	16		491	Oh, What Love	
fl5		11	21		079	Old Ship of Zion, The	
fl5		11	21		062	Parting Hand	
fl5		11	23		205	Pleasant Hill	
fl5		5	21		162	Plenary	
fl5		5	21		544	Praise Him	
fl5		11	21		409	Promised Day	
fl5		5	16		030B	Prospect	
fl5		5	16		298	Providence	
fl5		11	21		153	Resurrected	
fl5		5	21		294	Rocky Road	
fl5		11	21		274B	Roll Jordan	
fl5		11	21		471	Savior's Name, The	
fl5		3	13		039B	Sharpsburg	
fl5		11	23		152	Shepherds Rejoice	
fl5		11	23		437	Sidney	
fl5		11	21		381	Sing On	
fl5		11	21		055	Sister's Farewell	
fl5		5	13		166	Still Better	
fl5		11	15		111B	To Die No More	
fl5		11	15		459	Tolling Bell	
fl5		6	21		329	Vain World Adieu	
fl5		11	15		097	We'll Soon Be There	
fl5		11	23		072T	Weary Souls, The	
fl5		5	15		108T	Weeping Sinners	
fl6	b.p.	11	15		138T	Adoration	
fl6		5	15		052T	Albion	
fl6		11	21		393	Alexander	
fl6	b.p.	11	21		493	Amanda Ray	
fl6		11	16		073B	Arlington	

mode	b.p.	low	high	fuge	page	other	
fl6		11	21		494	Big Creek	
fl6		11	21		420	Bishop	
fl6		5	16		473	Carmarthen	
fl6		11	21	fuge	386	Christ Our Song	
fl6		5	21		134	Christian's Hope, The	
fl6		5	21		225B	Christmas Anthem	
fl6	b.p.	11	16		081B	Cookham	
fl6		11	21		032T	Corinth	
fl6		5	16		063	Coronation	
fl6		11	21		382	Coston	
fl6		11	21		531	Dura	
fl6	b.p.	5	21		123T	Dying Christian, The	
fl6		11	16		236	Easter Anthem	
fl6		11	21	fuge	483	Eternal Light	
fl6	b.p.	11	21		348B	Fleeting Days	
fl6		5	21		389	Fredericksburg	
fl6		11	15	fuge	511	Great Redeemer	
fl6		5	16		127	Green Fields	
fl6		11	15		448B	Grieved Soul, The	
fl6	b.p.	5	15		343	Happy Home	
fl6		5	16		388	Happy Sailor, The	
fl6		11	15	fuge	371	Heavenly Dove	
fl6	b.p.	11	21		303	Heavenly Land	
fl6		11	15		378T	Heavenly Port, The	
fl6	b.p.	5	22		484	Heavenly Union	
fl6	b.p.	11	21		076T	Holiness	
fl6		11	21		541	Home of the Blest	
fl6		11	16		568	I Want to Go to Heaven	
fl6	b.p.	11	23		045B	Imandra New	
fl6		5	16		131B	Invocation (First)	
fl6	b.p.	11	21		105	Jewett	
fl6		5	16		144	Jubilee	
fl6		11	16		046	Let Us Sing	
fl6		5	15		467	Lisbon	
fl6		11	21	fuge	558	Living Streams	
fl6		2	13		477	Lord, We Adore Thee	
fl6		5	15		104	Lovely Story, The	
fl6		6	14		124	Lover of the Lord	
fl6		11	21		405	Marcellas, The	final on 15
fl6		11	16		452	Martin	
fl6		11	16		049B	Mear	
fl6		11	21	fuge	470	Mercy Seat, The	

mode	b.p.	low	high	fuge	page	tune name	other
fl6		3	11		394	Messiah's Praise, The	final on 5
fl6		5	16	fuge	273	Milford	
fl6		11	23		130	Millennium	
fl6		11	16	fuge	474	Mount Desert	
fl6	b.p.	11	21		088B	Mount Zion (Second)	
fl6		5	21		560	My Home (Second)	
fl6	b.p.	11	21		490	My Shepherd Guides	
fl6	b.p.	11	21	fuge	316	New Hope	
fl6		11	15	fuge	036B	Ninety-Fifth	
fl6		11	21		295	Odem (First)	
fl6	b.p.	5	15		068B	Ortonville	
fl6	b.p.	11	21		387	Penick	
fl6		5	15		047T	Primrose	
fl6		11	21		043	Primrose Hill	
fl6		11	22	fuge	441	Raymond	
fl6		11	21		480	Redemption	
fl6	b.p.	5	16		319	Religion is a Fortune	
fl6	b.p.	11	15		225T	Reynolds	
fl6		11	21		435	Sacred Rest	
fl6	b.p.	5	15		569B	Sacred Throne	
fl6		11	16		489	Savior's Call, The	
fl6	b.p.	11	21		080B	Service of the Lord	
fl6		11	23	fuge	186	Sherburne	
fl6		5	16		34B	St. Thomas	
fl6		11	16		145B	Sweet Affliction	
fl6		11	21		476	Throne of Grace, The	
fl6		5	16		339	When I Am Gone	
fl6		11	21		548	Wootten	
fl6		11	21		404	Youth will soon be Gone	
dl6		5	16		084	Amsterdam	
dl6		5	15		098	Dull Care	
dl6		5	21		449	Fatherland	
dl6		11	16		070T	Gainsville	
dl6		5	15		565	Hill of Zion, The	
dl6		11	21		143	Pleyel's Hymn (First)	
dl6		5	15	fuge	078	Stafford	
dl6		11	21		087	Sweet Canaan	
dl6		11	23		424	Sweet Union	
fl7		11	23		178	Africa	
fl7		11	21	fuge	293	Akers	

mode	b.p.	low	high	fuge	page		other
fl7		5	15	fuge	472	Akin	
fl7		5	15		122	All Is Well	
fl7		7	15	fuge	150	Amity	
fl7		5	21		103	Animation	
fl7		11	23	fuge	553	Anthem on the Beginning	final on 21
fl7		11	21		488	As We Go On	
fl7		7	21	fuge	091	Assurance	
fl7		11	22	fuge	217	Ballstown	
fl7		5	16		232	Baptismal Anthem	
fl7		11	23	fuge	269	Bear Creek	
fl7		11	21	fuge	292	Behold the Savior	
fl7		5	15		486	Beneficence	
fl7		5	16	fuge	454	Better Land, The	
fl7		11	22	fuge	550	Blissful Dawning	
fl7	b.p.	3	15		100	Bower of Prayer, The	
fl7		6	14	fuge	276	Bridgewater	
fl7		11	21	fuge	468	Bristol	
fl7		11	21	fuge	422	Burdette	
fl7		11	24	fuge	120	Chambers	final on 21
fl7		11	21		502	Charge to Keep, A	final on 21
fl7		11	21		052B	Charlestown	
fl7		11	23		407	Charlton	final on 21
fl7		11	21		479	Chester	
fl7	b.p.	11	23	fuge	432	Cheves	
fl7		6	21		057	Christian Soldier	
fl7		11	21		177	Christian's Flight, The	
fl7	b.p.	11	21		206	Christian's Hope	
fl7		5	15		347	Christian's Farewell	
fl7		5	15		313T	Concord	
fl7		3	16		270	Confidence	
fl7		5	15	fuge	297	Conversion	
fl7		5	15		510	Corley	
fl7		11	22		169	Dartmouth	
fl7		7	16		263	Doddridge	
fl7		5	15		415	Easter Morn	
fl7		11	21	fuge	200	Edom	
fl7		11	22		139	Elysian	
fl7		11	23		184	Enfield	
fl7		2	14		157	Essay	
fl7		11	21	fuge	336	Eternal Home	
fl7		11	22	fuge	171	Exhortation (First)	
fl7		7	16		333	Family Circle	

mode	b.p.	low	high	fuge	page	tune name	other
fl7		7	16		515	Federal Street	
fl7		5	16		096	Few Happy Matches	
fl7		11	21	fuge	530	Glad New Song, A	
fl7		5	15	fuge	099	Gospel Trumpet	
fl7		5	16	fuge	198	Green Street	
fl7		11	23		301	Greenland	
fl7		5	16	fuge	538	Hampton	
fl7		5	21	fuge	172	Harmony	
fl7		11	21	fuge	573	Harpeth Valley	
fl7		11	21	fuge	466	Haynes Creek	
fl7		11	22		518	Heavenly Anthem	final on 21
fl7		3	14		566	Hebron	
fl7		7	23		041	Home in Heaven	
fl7		5	16		373	Homeward Bound	
fl7		3	13		050B	Humility	
fl7		5	16	fuge	193	Huntington	
fl7		11	21		446	Infinite Day	final on 21
fl7		11	24	fuge	327	Invitation	final on 21
fl7		5	15		492	Invocation (Second)	
fl7		5	16	fuge	551	Jacob's Vision	
fl7		11	21	fuge	426B	Jasper	
fl7		11	23		156	Jesus Rose	final on 21
fl7		11	21	fuge	439	Jordan (Second)	
fl7		5	15		513	Joyful	
fl7		3	13		147B	Laban	
fl7		7	21		572	Lamb of God, The	
fl7		11	21	fuge	380	Lawrenceburg	
fl7		11	22	fuge	137	Liberty	
fl7		5	15		030T	Love Divine	
fl7		5	15		413	Loved Ones, The	
fl7		11	21		291	Majesty	
fl7	b.p.	11	21		322	Man's Redemption	
fl7		11	21	fuge	392	Manchester	
fl7		5	15	fuge	228	Marlborough	
fl7		11	21		438	Marriage in the Skies, The	
fl7		11	21	fuge	517	Mars Hill	final on 21
fl7		11	21	fuge	353	McGraw	
fl7		3	15	fuge	189	Montgomery	
fl7		7	23	fuge	304	Morgan	
fl7		11	21	fuge	436	Morning Sun	
fl7		11	22	fuge	218	Mount Pleasant	
fl7		11	25	fuge	220	Mount Zion (First)	final on 21

mode	b.p.	low	high	fuge	page	other	
fl7		5	21		358	Murillo's Lesson	
fl7		5	14	fuge	546	My Brightest Days	
fl7		11	21	fuge	527	My Life and Breath	
fl7		11	21	fuge	478	My Rising Sun	
fl7		5	15		497	Natick	
fl7		5	16		350	Nativity	
fl7		11	22	fuge	485	New Agatite	
fl7		11	21	fuge	395	New Bethel	
fl7		11	21	fuge	534	New Georgia	
fl7		3	16		412	New Hosanna	
fl7		11	21	fuge	299	New Jerusalem	
fl7		11	24	fuge	202	New Lebanon	
fl7		3	15		182	Newburgh	
fl7		5	15		540	Nidrah	
fl7		3	15	fuge	155	Northfield	
fl7		5	16	fuge	362	Norwich	
fl7		2	13		334	O Come Away	
fl7		11	22		501	O'Leary	
fl7		11	21	fuge	222	Ocean	
fl7		5	21		227	Ode of Life's Journey	
fl7		11	23		242	Ode On Science	
fl7		11	21	fuge	340	Odem (Second)	
fl7		5	15		049T	Old Hundred	
fl7		5	21		135	Olney	
fl7		11	21		463	Our Humble Faith	
fl7		5	16	fuge	306	Oxford	
fl7		11	23	fuge	384	Panting for Heaven	final on 21
fl7		11	21		521	Parting Friends (Third)	
fl7		11	22	fuge	532	Peace and Joy	final on 21
fl7		5	15		571	Penitence	
fl7		11	25		174	Petersburg	final on 21
fl7		11	21		185	Pilgrim's Farewell	
fl7		5	14	fuge	351	Pittsford	
fl7		11	22	fuge	556	Portland	
fl7		5	15		223	Portuguese Hymn	
fl7		11	21		167	Pray, Brethren, Pray	
fl7	b.p.	11	21	fuge	318	Present Joys	
fl7		11	22	fuge	187	Protection (1)	
fl7		11	22		402	Protection (Second)	final on 21
fl7		3	14	fuge	344	Rainbow	
fl7		3	13		154	Rest for the Weary	
fl7		5	16		234	Reverential Anthem	

mode	b.p.	low	high	fuge	page	tune name	other
fl7		5	15		496	Rock That Is Higher Than I, The	
fl7		11	21	fuge	283	Sabbath Morning	
fl7		11	21		456	Sacred Mount	
fl7		5	15	fuge	460	Sardis	
fl7		11	22	fuge	192	Schenectady	final on 21
fl7		5	16		369	Send a Blessing	
fl7		3	13		507	Sermon on the Mount	
fl7		5	15	fuge	212	Sharon	
fl7		11	21	fuge	279	Shepherd's Flock, The	
fl7		11	22	fuge	464	Sheppard	
fl7		5	15	fuge	528	Showers of Blessings	
fl7		11	24		311	Silver Street	final on 21
fl7		7	16		323B	Soft Music	
fl7		11	21		325	Soldier of the Cross	
fl7		11	22	fuge	391	Sounding Joy	
fl7		11	23	fuge	365	Southwell	
fl7		5	21		188	Spring	
fl7		5	21		368	Stony Point	
fl7		11	24	fuge	352	Swanton	
fl7		11	21		061	Sweet Rivers	
fl7		5	21		140	Sweet Solitude	
fl7		11	22		151	Symphony	final on 21
fl7		11	23	fuge	543	Thou Art God	final on 21
fl7		6	16		231	Thou Art Passing Away	
fl7		11	21	fuge	208	Traveling On	
fl7		3	14		149	Trumpet, The	
fl7		11	21		524	Twenty-third Psalm, The	final on 21
fl7		5	16		280	Westford	
fl7	b.p.	6	21		465	Where There's No Trouble and Sorrow	
fl7		7	21		038T	Winter	
fl7		11	22	fuge	195	Worcester	
dl7		4	14		054	Blessed Lamb, The	
dl7		5	14		287	Cambridge	
dl7		5	15		230	Converting Grace	
dl7		5	15		164	Duane Street	
dl7		5	23		450	Elder	
dl7		11	21		569T	Emmaus	
dl7		5	21	fuge	250	Heavenly Vision	
dl7		5	16		066	Jordan (First)	
dl7		11	24		309	Living Lamb	
dl7		11	21		503	Lloyd	

mode	b.p.	low	high	fuge	page		other
di7		7	21		361	Loving Jesus	final on 21
di7		11	22		451	Mary's Grief and Joy	
di7		5	16		136	Morality	
di7		11	22		094	Never Part	
di7		11	22	fuge	431	New Bethany	
di7		5	15		523	Pleyel's Hymn (Second)	
di7		5	15		113	Prodigal Son, The	
di7		5	16		254	Rose of Sharon	
di7		5	21		461	Shining Star	
di7		11	21		161	Sweet Home	
di7		7	21		310	Weeping Savior (Second)	
di7		11	21		028B	Wells	
dM5		11	21		089	Church's Desolation, The	
dM5		11	21		073T	Cusseta	
dM5		11	21		129	Heavenly Armor	
dM5		11	21		207	Louisiana	
dM5		11	22		495	Midnight Cry, The	
dM5		11	21		417	Weeping Pilgrim	
dM6	b.p.	11	21		179	Christian Warfare, The	
dM6		6	21		044	Converted Thief, The	
dM6	b.p.	11	21		146	Hallelujah	
dM6		5	16		288	White	
sm6		5	21		074T	Enquirer, The	final on 21
sm6		7	16		278B	Traveling Pilgrim	
sm6		11	21		160T	War Department	
sm6		7	21		159	Wondrous Love	
dM7	b.p.	11	21		082T	Bound for Canaan	
dM7		6	14		147T	Boylston	
sD5		7	21		056B	Villulia	
sD6		5	17		348T	Ainslie	
sD6		7	13		385T	Can I Leave You?	
sD6		11	21		448T	Consecration	
sD6		7	15		268	David's Lamentation	
sD6		5	17	fuge	272	Exhortation (Second)	
sD6		5	15		029T	Fairfield	
sD6		5	21		458	Friendship	

mode	b.p.	low	high	fuge	page	tune name	other
sD6		5	15		567	Great Day, The	
sD6		7	21		345B	I'm On My Journey Home	
sD6		4	15		148	Jefferson	
sD6		5	17	fuge	053	Jerusalem	
rD6		5	15		074B	King of Peace	
sD6		5	15		275T	Loving-Kindness	
sD6		5	15		324	North Port	
sD6		11	21		128	Promised Land, The	
sD6	b.p.	7	23		360	Royal Band, The	
sD6		7	15	fuge	107	Russia	
sD6	b.p.	7	21		065	Sweet Prospect	
sD6		7	22		326	Weary Pilgrim	
sD6		5	15	fuge	505	Where Ceaseless Ages Roll	
rD6		5	17	fuge	036T	America	
rD6		5	16		355	Anthem on the Saviour	mod. to f17
rD6		7	21	fuge	430	Arbacoochee	
rD6		7	17		271T	Arkansas	
rD6		11	21		027	Bethel	
rD6		4	15		077T	Child of Grace, The	
rD6		7	21	fuge	168	Cowper	
rD6		3	13	fuge	383	Eternal Day	
rD6	b.p.	5	17		069B	Farewell to All (First)	
rD6		7	23		385T	Fight On	final on 21
rD6		7	21	fuge	203	Florida	
rD6		11	21		330T	Horton	
rD6		7	21		278T	Love Shall Never Die	
rD6		11	21		375	Love the Lord	
rD6		7	23	fuge	419	Melancholy Day	
rD6		7	17		370	Monroe	
rD6		11	21		085	Morning Trumpet, The	
rD6		5	17		378B	Never Turn Back	
rD6	b.p.	7	21		545	Pilgrim's Way, The	final on 15
rD6	b.p.	5	21		328	Praise God	
rD6		11	21		026	Samaria	
rD6		5	17		312T	Sing to Me of Heaven!	
rD6		11	21		132	Sinner's Friend	
rD6		5	15		118	Stockwood	
rD6		7	21		539	Supplication	
rD6	b.p.	11	23		421	Sweet Morning	
rD6		3	14		029B	Tribulation	
rD6		11	23		095	Vernon	

mode	b.p.	low	high	fuge	page	other	
rD6	b.p.	7	21		457	Wayfaring Stranger	
rD6		7	21		033T	Weeping Savior (First)	
sd7		5	16	fuge	300	Calvary	
sd7		3	15		240	Christian Song	mod. to f17
sd7		7	21		429	Christian's Delight	
sd7		5	21		245	Claremont	
sd7		5	17		123B	Cross of Christ	
sd7		7	21		082B	Edgefield	
sd7		5	17	fuge	260	Farewell Anthem	
sd7		5	15		071	Leander	
sd7		7	21		210	Lena	
sd7		11	25	fuge	442	New Jordan	final on 21
sd7		11	21		173	Phoebus	
sd7		7	21	fuge	214	Repentance	
sd7		7	21		114	Saint's Delight, The	
sd7		3	15		068T	Salem	
sd7		11	16		080T	Shouting Song	no 7
sd7		7	22		332	Sons of Sorrow	
sd7		11	22	fuge	211	Whitestown	
rA5		11	21		067	Columbus	
rA5		7	21		032B	Distress	
rA5		7	21		106	Ecstasy	
rA5		7	21		274T	Golden Harp, The	
rA5		7	17		399B	Happy Christian	
rA5		5	17		376	Help Me To Sing	
rA5		5	17		047B	Idumea	
rA5		5	17		312B	Restoration (First)	
rA5		7	21		070B	Save, Mighty Lord	
rA6	b.p.	11	21		277	Antioch	
rA6		7	21		039T	Detroit	
rA6	b.p.	7	21		399T	Dying Friend, The	
rA6	b.p.	7	21		101B	Holy City	
rA6	b.p.	7	21		131T	Messiah	
rA6		7	21		267	Parting Friends (First)	
rA6		7	21		201	Pilgrim	
rA6	b.p.	7	17		108B	Traveler, The	
rA6		11	21	fuge	504	Wood Street	raised 6 <sup>th</sup>
lA6	b.p.	6	16		133	Hebrew Children	

mode	b.p.	low	high	fuge	page	tune name	other
rA7		11	23	fuge	196	Alabama	
rA7		3	15	fuge	444	All Saints New	
rA7		11	25		346	American Star, The	
rA7		7	21		506	Ark, The	
rA7		11	17		028T	Aylesbury	
rA7		2	13		126	Babel's Streams	
rA7		11	22		117	Babylon Is Fallen	
rA7		11	21		416	Christian's Nightly Song, The	
rA7		7	22		042	Clamanda	
rA7		11	16		313B	Cobb	
rA7		11	21		367	Consolation	
rA7		7	23	fuge	349	Cross for Me, A	
rA7		11	23	fuge	216	Delight	
rA7		11	23		115	Edmonds	
rA7		7	23	fuge	377	Eternal Praise	final on 21
rA7		7	21	fuge	209	Evening Shade	
rA7		11	23	fuge	181	Exit	final on 21
rA7		3	15		125	Expression	
rA7		5	21		165	Family Bible	
rA7		11	21		330B	Fellowship	
rA7		11	21	fuge	397	Fountain, The	
rA7		7	21		102	Fulfilment	
rA7		11	21		320	Funeral Anthem	
rA7		11	23	fuge	197	Georgia	
rA7	b.p.	11	21	fuge	423	Grantville	
rA7		11	23		547	Granville	
rA7		11	22	fuge	183	Greenwich	
rA7		11	21	fuge	286	Heavenly Home	
rA7		11	21	fuge	453	Holly Springs	tends to sd7
rA7		5	17	fuge	542	I'll Seek His Blessings	
rA7		5	17	fuge	315	Immensity	
rA7		11	22		048B	Kedron	
rA7		11	21		500	Living Hope	
rA7		11	23	fuge	302	Logan	
rA7		5	16	fuge	433	McKay	
rA7		11	21	fuge	163T	Morning	
rA7		11	21	fuge	411	Morning Prayer	
rA7		11	21		050T	Mortality	
rA7		11	23	fuge	110	Mount Vernon	
rA7		11	23		051	My Home (First)	
rA7		11	23		215	New Topia	final on 21
rA7		11	22	fuge	440	North Salem	

mode	b.p.	low	high	fuge	page	other	
rA7		11	21	fuge	396	Notes Almost Divine	
rA7		11	23	fuge	481	Novakoski	
rA7		3	13		086	Poland	
rA7		7	23	fuge	372	Rockport	
rA7		2	13		296	Sardinia	
rA7		11	21	fuge	224	Save, Lord, or We Perish	
rA7		4	13	fuge	455	Soar Away	
rA7		11	21		487	Soldier's Delight	
rA7		7	21		379	Span of Life	
rA7		11	21	fuge	142	Stratfield	
rA7		7	23	fuge	536	Sweet Majesty	
rA7		11	23		160B	Turn, Sinner, Turn	final on 21
rA7		4	16		116	Union	
rA7		5	15		083T	Vale of Sorrow	
rA7		11	23		180	Vermont	
rA7		11	21		191	Virginia	
rA7		11	21		038B	Windham	
rA7		11	21	fuge	447	Wondrous Cross	
rA7		7	21	fuge	428	World Unknown	
rA7		7	21	fuge	522	Ye Heedless Ones	
rA7		11	23	fuge	564	Zion	
IP5		3	14		535	Shawmut	
IP7		6	16	fuge	562	Infinite Delight	
IP7		4	14		308	Parting Friends (Second)	final on 15

## A Range Index of *The Sacred Harp* (1991)

How to symbolize the upper and lower limits of each range was carefully considered. The initials of the *doremi* scale (d, r ... t, octave of the tonic, D, R ... T, octave below the tonic, d', r' ... t'), octave above the tonic), may seem the obvious choice, but have several drawbacks: the pentatonic base is often an infra-modal characteristic, and requires prudential judgment; also, the same range can be identified by more than one set of letters, making comparison difficult. Some melodic indices use sequential numbers to represent degrees of the chromatic scale; this seems unnecessarily complicated, as fasola modality is clearly diatonic (at least in its written form; the shading of semitones and other notes aurally conditioned by the harmonic series is outside the scope of this study). A modified numeric system was finally deemed the most useful: 11-17 (octave of the tonic), 1-7 (octave below the tonic) and 21-27 (octave above the tonic). Although unfamiliar, this system has obvious advantages, as it represents the degrees of the scale, regardless of the intervals they occupy.

As this *Range Index* may be of use in selecting tunes with particular characteristics, the melodies are listed by mode within each range.

The majority of melodies in the present study occupy one of the three general ranges defined by Bronson:

authentic	(11 21)	147
plagal	(5 15)	60
mixed	(5 21)	35
	<i>total</i>	242 (less than a majority)

However, allowing a variance of one degree above or below the limits of these ranges shows the following:

authentic	plagal	mixed
7 17 4	4 14 2	4 17 0
7 21 39	4 15 2	4 21 0
7 22 3	4 16 1	4 22 0
11 17 1	5 14 3	5 17 14
11 21 147	5 15 60	5 21 35
11 22 31	5 16 41	5 22 2
<i>total</i> 225	6 14 3	6 17 0
	6 15 0	6 21 10
	6 16 3	6 22 0
	<i>total</i> 115	<i>total</i> 61

Thus broadly defined, these three ranges characterize 401, over 72% of the melodies.

No general correlation between range and mode was observed. One sub-group within the distribution of ranges, however, may be worthy of notice: nineteen melodies have an upper limit of 17. Their distribution follows:

lower limit	mode		
5 17 = 14	sD6 = 3	rA5 = 4	
7 17 = 4	rD6 = 6	rA6 = 1	
11 17 = 1	sd7 = 2	rA7 = 3	

Fourteen prefer the pentatonic scale on *re*, and five on *sol*. Only five (all part of the *re* set) are arguably in the authentic range. Regardless of mode, the fourteen melodies 5 17 and the single tune 11 17 present an anomaly: the former can be construed as three conjunct fourths (e.g. *LA re sol do*), and the latter as two (*re sol do*), a configuration known to the ancient Greeks (and the Roman Boethius) as *synaphe*.

<b>low</b>	<b>high</b>	<b>mode</b>	<b>b.p.</b>	<b>fuge</b>	<b>page</b>	<b>tune name</b>	
2	13	fI6			477	Lord, We Adore Thee	
2	13	fI7			334	O Come Away	
2	13	rA7			126	Babel's Streams	
2	13	rA7			296	Sardinia	
2	14	fI7			157	Essay	
2	15	fL6	b.p.		213B	Warning	
3	11	fI6			394	Messiah's Praise, The	
3	13	fL6			163B	China	
3	13	fL6			549	Phillips Farewell	
3	13	fL6			408	Weeping Mary	
3	13	fI5			039B	Sharpsburg	
3	13	fI7			050B	Humility	
3	13	fI7			147B	Laban	
3	13	fI7			154	Rest for the Weary	
3	13	fI7			507	Sermon on the Mount	
3	13	rD6		fuge	383	Eternal Day	
3	13	rA7			086	Poland	
3	14	fI7			566	Hebron	
3	14	fI7		fuge	344	Rainbow	
3	14	fI7			149	Trumpet, The	
3	14	rD6			029B	Tribulation	
3	14	IP5			535	Shawmut	
3	15	fL6			359	Bride's Farewell, The	
3	15	fL6			064	Nashville	
3	15	fI5			056T	Columbiana	
3	15	fI5			076B	Desire for Piety	
3	15	fI7	b.p.		100	Bower of Prayer, The	
3	15	fI7		fuge	189	Montgomery	
3	15	fI7			182	Newburgh	
3	15	fI7		fuge	155	Northfield	
3	15	sd7			240	Christian Song	
3	15	sd7			068T	Salem	
3	15	rA7		fuge	444	All Saints New	
3	15	rA7			125	Expression	
3	16	fL6			058	Pisgah	

mode	b.p.	low	high	fuge	page	tune name	other
3	16	fI5			491	Oh, What Love	
3	16	fI7			270	Confidence	
3	16	fI7			412	New Hosanna	
4	13	rA7		fuge	455	Soar Away	
4	14	dI7			054	Blessed Lamb, The	
4	14	lP7			308	Parting Friends (Second)	
4	15	sD6			148	Jefferson	
4	15	rD6			077T	Child of Grace, The	
4	16	rA7			116	Union	
5	13	fL6			077B	Holcombe	
5	13	fL6	b.p.		354T	Lebanon	
5	13	fL6			445	Passing Away	
5	13	fL6			418	Rees	
5	13	fI5			048T	Devotion	
5	13	fI5			166	Still Better	
5	14	fI7		fuge	546	My Brightest Days	
5	14	fI7		fuge	351	Pittsford	
5	14	dI7			287	Cambridge	
5	15	fL6	b.p.		401	Cuba	
5	15	fL6	b.p.		410T	Dying Californian, The	
5	15	fL6	b.p.		425	Golden Streets	
5	15	fL6			266	Kingwood	
5	15	fL6		fuge	040	Lenox	
5	15	fL6			235	Long Sought Home	
5	15	fL6	b.p.		031T	Ninety-Third Psalm	
5	15	fL6	b.p.	fuge	475	Thankful Heart, A	
5	15	fI5			072B	Bellevue	
5	15	fI5			176B	Blooming Youth	
5	15	fI5			059	Holy Manna	
5	15	fI5			482	Mulberry Grove	
5	15	fI5			045T	New Britain	
5	15	fI5			108T	Weeping Sinners	
5	15	fI6			052T	Albion	
5	15	fI6	b.p.		343	Happy Home	
5	15	fI6			467	Lisbon	

low	high	mode	b.p.	fuge	page	tune name	
5	15	fI6			104	Lovely Story, The	
5	15	fI6	b.p.		068B	Ortonville	
5	15	fI6			047T	Primrose	
5	15	fI6	b.p.		569B	Sacred Throne	
5	15	dI6			098	Dull Care	
5	15	dI6			565	Hill of Zion, The	
5	15	dI6		fuge	078	Stafford	
5	15	fI7		fuge	472	Akin	
5	15	fI7			122	All Is Well	
5	15	fI7			486	Beneficence	
5	15	fI7			347	Christian's Farewell	
5	15	fI7			313T	Concord	
5	15	fI7		fuge	297	Conversion	
5	15	fI7			510	Corley	
5	15	fI7			415	Easter Morn	
5	15	fI7		fuge	099	Gospel Trumpet	
5	15	fI7			492	Invocation (Second)	
5	15	fI7			513	Joyful	
5	15	fI7			030T	Love Divine	
5	15	fI7			413	Loved Ones, The	
5	15	fI7		fuge	228	Marlborough	
5	15	fI7			497	Natick	
5	15	fI7			540	Nidrah	
5	15	fI7			049T	Old Hundred	
5	15	fI7			571	Penitence	
5	15	fI7			223	Portuguese Hymn	
5	15	fI7			496	Rock That Is Higher Than I, The	
5	15	fI7		fuge	460	Sardis	
5	15	fI7		fuge	212	Sharon	
5	15	fI7		fuge	528	Showers of Blessings	
5	15	dI7			230	Converting Grace	
5	15	dI7			164	Duane Street	
5	15	dI7			523	Pleyel's Hymn (Second)	
5	15	dI7			113	Prodigal Son, The	
5	15	sD6			029T	Fairfield	
5	15	sD6			567	Great Day, The	
5	15	sD6			275T	Loving-Kindness	
5	15	sD6			324	North Port	
5	15	sD6		fuge	505	Where Ceaseless Ages Roll	
5	15	sD6			074B	King of Peace	
5	15	rD6			118	Stockwood	
5	15	sd7			071	Leander	

mode	b.p.	low	high	fuge	page	tune name	other
5	15	rA7			083T	Vale of Sorrow	
5	16	fL6	b.p.		285T	Arnold	
5	16	fL6			035	Saints Bound for Heaven, The	
5	16	fL6			512	Spirit Shall Return, The	
5	16	fL6			290	Victoria	
5	16	fI5			081T	Beach Spring	
5	16	fI5			109	Carnsville	
5	16	fI5			331	Jester	
5	16	fI5			030B	Prospect	
5	16	fI5			298	Providence	
5	16	fI6			473	Carmarthen	
5	16	fI6			063	Coronation	
5	16	fI6			127	Green Fields	
5	16	fI6			388	Happy Sailor, The	
5	16	fI6			131B	Invocation (First)	
5	16	fI6			144	Jubilee	
5	16	fI6	fuge		273	Milford	
5	16	fI6	b.p.		319	Religion is a Fortune	
5	16	fI6			34B	St. Thomas	
5	16	fI6			339	When I Am Gone	
5	16	dI6			084	Amsterdam	
5	16	fI7			232	Baptismal Anthem	
5	16	fI7	fuge		454	Better Land, The	
5	16	fI7			096	Few Happy Matches	
5	16	fI7	fuge		198	Green Street	
5	16	fI7	fuge		538	Hampton	
5	16	fI7			373	Homeward Bound	
5	16	fI7	fuge		193	Huntington	
5	16	fI7	fuge		551	Jacob's Vision	
5	16	fI7			350	Nativity	
5	16	fI7	fuge		362	Norwich	
5	16	fI7	fuge		306	Oxford	
5	16	fI7			234	Reverential Anthem	
5	16	fI7			369	Send a Blessing	
5	16	fI7			280	Westford	
5	16	dI7			066	Jordan (First)	
5	16	dI7			136	Morality	
5	16	dI7			254	Rose of Sharon	
5	16	dM6			288	White	
5	16	rD6			355	Anthem on the Saviour	
5	16	sd7	fuge		300	Calvary	

low	high	mode	b.p.	fuge	page	tune name	
5	16	rA7		fuge	433	McKay	
5	17	sD6			348T	Ainslie	
5	17	sD6		fuge	272	Exhortation (Second)	
5	17	sD6		fuge	053	Jerusalem	
5	17	rD6		fuge	036T	America	
5	17	rD6	b.p.		069B	Farewell to All (First)	
5	17	rD6			378B	Never Turn Back	
5	17	rD6			312T	Sing to Me of Heaven!	
5	17	sd7			123B	Cross of Christ	
5	17	sd7		fuge	260	Farewell Anthem	
5	17	rA5			376	Help Me To Sing	
5	17	rA5			047B	Idumea	
5	17	rA5			312B	Restoration (First)	
5	17	rA7		fuge	542	I'll Seek His Blessings	
5	17	rA7		fuge	315	Immensity	
5	21	fL6			314	Cleburne	
5	21	fL6	b.p.		141	Complainer	
5	21	fL6			090	Look Out	
5	21	fL6			069T	Minister's Farewell	
5	21	fL6	b.p.		338	Sawyer's Exit	
5	21	fI5			092	Burk	
5	21	fI5			284	Garden Hymn	
5	21	fI5			204	Mission	
5	21	fI5			406	New Harmony	
5	21	fI5			390	New Prospect	
5	21	fI5			162	Plenary	
5	21	fI5			544	Praise Him	
5	21	fI5			294	Rocky Road	
5	21	fI5			337	Mercy's Free	
5	21	fI6			134	Christian's Hope, The	
5	21	fI6			225B	Christmas Anthem	
5	21	fI6	b.p.		123T	Dying Christian, The	
5	21	fI6			389	Fredericksburg	
5	21	fI6			560	My Home (Second)	
5	21	dI6			449	Fatherland	
5	21	fI7			103	Animation	
5	21	fI7	fuge		172	Harmony	
5	21	fI7			358	Murillo's Lesson	
5	21	fI7			227	Ode of Life's Journey	
5	21	fI7			135	Olney	

mode	b.p.	low	high	fuge	page	tune name	other
5	21	fI7			188	Spring	
5	21	fI7			368	Stony Point	
5	21	fI7			140	Sweet Solitude	
5	21	dI7		fuge	250	Heavenly Vision	
5	21	dI7			461	Shining Star	
5	21	sm6			074T	Enquirer, The	
5	21	sD6			458	Friendship	
5	21	rD6	b.p.		328	Praise God	
5	21	sd7			245	Claremont	
5	21	ra7			165	Family Bible	
5	22	fL6			342	Old-Fashioned Bible, The	
5	22	fI6	b.p.		484	Heavenly Union	
5	23	dI7			450	Elder	
6	14	fI6			124	Lover of the Lord	
6	14	fI7		fuge	276	Bridgewater	
6	14	dM7			147T	Boylston	
6	16	fI7			231	Thou Art Passing Away	
6	16	lA6	b.p.		133	Hebrew Children	
6	16	lP7		fuge	562	Infinite Delight	
6	21	fL6			033B	Abbeville	
6	21	fL6	b.p.		083B	Dying Minister, The	
6	21	fL6			170	Exhilaration	
6	21	fL6			335	Return Again	
6	21	fI5			060	Day of Worship	
6	21	fI5			289	Greensborough	
6	21	fI5			329	Vain World Adieu	
6	21	fI7			057	Christian Soldier	
6	21	fI7	b.p.		465	Where There's No Trouble and Sorrow	
6	21	dM6			044	Converted Thief, The	
6	23	fI5			410B	Mutual Love	
7	13	sD6			385T	Can I Leave You?	
7	15	fI7		fuge	150	Amity	
7	15	sD6			268	David's Lamentation	
7	15	sD6		fuge	107	Russia	

low	high	mode	b.p.	fuge	page	tune name	
7	16	fI7			263	Doddridge	
7	16	fI7			333	Family Circle	
7	16	fI7			515	Federal Street	
7	16	fI7			323B	Soft Music	
7	16	sm6			278B	Traveling Pilgrim	
7	17	rD6			271T	Arkansas	
7	17	rD6			370	Monroe	
7	17	rA5			399B	Happy Christian	
7	17	rA6	b.p.		108B	Traveler, The	
7	21	fL6			462	Faith and Hope	
7	21	fI7		fuge	091	Assurance	
7	21	fI7			572	Lamb of God, The	
7	21	fI7			038T	Winter	
7	21	dI7			361	Loving Jesus	
7	21	dI7			310	Weeping Savior (Second)	
7	21	sm6			159	Wondrous Love	
7	21	sD5			056B	Villulia	
7	21	sD6			345B	I'm On My Journey Home	
7	21	sD6	b.p.		065	Sweet Prospect	
7	21	rD6		fuge	430	Arbacoochee	
7	21	rD6		fuge	168	Cowper	
7	21	rD6		fuge	203	Florida	
7	21	rD6			278T	Love Shall Never Die	
7	21	rD6	b.p.		545	Pilgrim's Way, The	
7	21	rD6			539	Supplication	
7	21	rD6	b.p.		457	Wayfaring Stranger	
7	21	rD6			033T	Weeping Savior (First)	
7	21	sd7			429	Christian's Delight	
7	21	sd7			082B	Edgefield	
7	21	sd7			210	Lena	
7	21	sd7		fuge	214	Repentance	
7	21	sd7			114	Saint's Delight, The	
7	21	rA5			032B	Distress	
7	21	rA5			106	Ecstasy	
7	21	rA5			274T	Golden Harp, The	
7	21	rA5			070B	Save, Mighty Lord	
7	21	rA6			039T	Detroit	
7	21	rA6	b.p.		399B	Dying Friend, The	
7	21	rA6	b.p.		101B	Holy City	
7	21	rA6	b.p.		131T	Messiah	

mode	b.p.	low	high	fuge	page	tune name	other
7	21	rA6			267	Parting Friends (First)	
7	21	rA6			201	Pilgrim	
7	21	rA7			506	Ark, The	
7	21	rA7		fuge	209	Evening Shade	
7	21	rA7			102	Fulfilment	
7	21	rA7			379	Span of Life	
7	21	rA7		fuge	428	World Unknown	
7	21	rA7		fuge	522	Ye Heedless Ones	
7	22	sD6			326	Weary Pilgrim	
7	22	sd7			t	Sons of Sorrow	
7	22	rA7			042	Clamanda	
7	23	fI7			041	Home in Heaven	
7	23	fI7		fuge	304	Morgan	
7	23	sD6	b.p.		360	Royal Band, The	
7	23	rD6			385T	Fight On	
7	23	rD6		fuge	419	Melancholy Day	
7	23	rA7		fuge	349	Cross for Me, A	
7	23	rA7		fuge	377	Eternal Praise	
7	23	rA7		fuge	372	Rockport	
7	23	rA7		fuge	536	Sweet Majesty	
11	15	fI5	.		101T	Canaan's Land	
11	15	fI5			111B	To Die No More	
11	15	fI5			459	Tolling Bell	
11	15	fI5			097	We'll Soon Be There	
11	15	fI6	b.p.		138T	Adoration	
11	15	fI6		fuge	511	Great Redeemer	
11	15	fI6			448B	Grieved Soul, The	
11	15	fI6		fuge	371	Heavenly Dove	
11	15	fI6			378T	Heavenly Port, The	
11	15	fI6		fuge	036B	Ninety-Fifth	
11	15	fI6	b.p.		225T	Reynolds	
11	16	fI5			111T	Journey Home	
11	16	fI6			073B	Arlington	
11	16	fI6	b.p.		081B	Cookham	
11	16	fI6			236	Easter Anthem	
11	16	fI6			568	I Want to Go to Heaven	
11	16	fI6			046	Let Us Sing	
11	16	fI6			452	Martin	

low	high	mode	b.p.	fuge	page	tune name	
11	16	fl6			049B	Mear	
11	16	fl6		fuge	474	Mount Desert	
11	16	fl6			489	Savior's Call, The	
11	16	fl6			145B	Sweet Affliction	
11	16	dl6			070T	Gainsville	
11	16	sd7			080T	Shouting Song	
11	16	rA7			313B	Cobb	
11	17	rA7			028T	Aylesbury	
11	21	fL6	b.p.		398	Dying Boy, The	
11	21	fL6		fuge	434	Fillmore	
11	21	fL6	b.p.		119	Heaven's My Home	
11	21	fL6	b.p.		345T	Jesus Is My Friend	
11	21	fL6		fuge	112	Last Words of Copernicus	
11	21	fL6	b.p.		037B	Liverpool	
11	21	fL6			323T	Mullins	
11	21	fL6			374	Oh, Sing With Me!	
11	21	fL6			414	Parting Friend	
11	21	fL6			176T	Ragan	
11	21	fL6	b.p.		145T	Warrenton	
11	21	fL6	b.p.		031B	Webster	
11	21	fl5			516	DeLong	
11	21	fl5			037T	Ester	
11	21	fl5			570	Farewell to All (Second)	
11	21	fl5			354B	Happy Land	
11	21	fl5			317	Jackson	
11	21	fl5			426T	Kelley	
11	21	fl5			321	Newnan	
11	21	fl5			138B	Ogletree	
11	21	fl5			079	Old Ship of Zion, The	
11	21	fl5			062	Parting Hand	
11	21	fl5			409	Promised Day	
11	21	fl5			153	Resurrected	
11	21	fl5			274B	Roll Jordan	
11	21	fl5			471	Savior's Name, The	
11	21	fl5			381	Sing On	
11	21	fl5			055	Sister's Farewell	
11	21	fl6			393	Alexander	
11	21	fl6	b.p.		493	Amanda Ray	
11	21	fl6			494	Big Creek	
11	21	fl6			420	Bishop	

mode	b.p.	low	high	fuge	page	tune name	other
11	21	fl6		fuge	386	Christ Our Song	
11	21	fl6			032T	Corinth	
11	21	fl6			382	Coston	
11	21	fl6			531	Dura	
11	21	fl6		fuge	483	Eternal Light	
11	21	fl6	b.p.		348B	Fleeting Days	
11	21	fl6	b.p.		303	Heavenly Land	
11	21	fl6	b.p.		076T	Holiness	
11	21	fl6			541	Home of the Blest	
11	21	fl6	b.p.		105	Jewett	
11	21	fl6		fuge	558	Living Streams	
11	21	fl6			405	Marcellas, The	
11	21	fl6		fuge	470	Mercy Seat, The	
11	21	fl6	b.p.		088B	Mount Zion (Second)	
11	21	fl6	b.p.		490	My Shepherd Guides	
11	21	fl6	b.p.	fuge	316	New Hope	
11	21	fl6			295	Odem (First)	
11	21	fl6	b.p.		387	Penick	
11	21	fl6			043	Primrose Hill	
11	21	fl6			480	Redemption	
11	21	fl6			435	Sacred Rest	
11	21	fl6	b.p.		080B	Service of the Lord	
11	21	fl6			476	Throne of Grace, The	
11	21	fl6			548	Wootten	
11	21	fl6			404	Youth will soon be Gone	
11	21	dl6			143	Pleyel's Hymn (First)	
11	21	dl6			087	Sweet Canaan	
11	21	fl7		fuge	293	Akers	
11	21	fl7			488	As We Go On	
11	21	fl7		fuge	292	Behold the Savior	
11	21	fl7		fuge	468	Bristol	
11	21	fl7		fuge	422	Burdette	
11	21	fl7			502	Charge to Keep, A	
11	21	fl7			052B	Charlestown	
11	21	fl7			479	Chester	
11	21	fl7			177	Christian's Flight, The	
11	21	fl7	b.p.		206	Christian's Hope	
11	21	fl7		fuge	200	Edom	
11	21	fl7		fuge	336	Eternal Home	
11	21	fl7		fuge	530	Glad New Song, A	
11	21	fl7		fuge	573	Harpeth Valley	
11	21	fl7		fuge	466	Haynes Creek	

low	high	mode	b.p.	fuge	page	tune name	
11	21	fl7			446	Infinite Day	
				fuge	426B	Jasper	
11	21	fl7		fuge	439	Jordan (Second)	
11	21	fl7		fuge	380	Lawrenceburg	
11	21	fl7			291	Majesty	
11	21	fl7	b.p.		322	Man's Redemption	
11	21	fl7		fuge	392	Manchester	
11	21	fl7			438	Marriage in the Skies, The	
11	21	fl7		fuge	517	Mars Hill	
11	21	fl7		fuge	353	McGraw	
11	21	fl7		fuge	436	Morning Sun	
11	21	fl7		fuge	527	My Life and Breath	
11	21	fl7		fuge	478	My Rising Sun	
11	21	fl7		fuge	395	New Bethel	
11	21	fl7		fuge	534	New Georgia	
11	21	fl7		fuge	299	New Jerusalem	
11	21	fl7		fuge	222	Ocean	
11	21	fl7		fuge	340	Odem (Second)	
11	21	fl7			463	Our Humble Faith	
11	21	fl7			521	Parting Friends (Third)	
11	21	fl7			185	Pilgrim's Farewell	
11	21	fl7			167	Pray, Brethren, Pray	
11	21	fl7	b.p.	fuge	318	Present Joys	
11	21	fl7		fuge	283	Sabbath Morning	
11	21	fl7			456	Sacred Mount	
11	21	fl7		fuge	279	Shepherd's Flock, The	
11	21	fl7			325	Soldier of the Cross	
11	21	fl7			061	Sweet Rivers	
11	21	fl7		fuge	208	Traveling On	
11	21	fl7			524	Twenty-third Psalm, The	
11	21	dl7			569T	Emmaus	
11	21	dl7			503	Lloyd	
11	21	dl7			161	Sweet Home	
11	21	dl7			028B	Wells	
11	21	dM5			089	Church's Desolation, The	
11	21	dM5			073T	Cusseta	
11	21	dM5			129	Heavenly Armor	
11	21	dM5			207	Louisiana	
11	21	dM5			417	Weeping Pilgrim	
11	21	dM6	b.p.		179	Christian Warfare, The	
11	21	dM6	b.p.		146	Hallelujah	
11	21	sm6			160T	War Department	

mode	b.p.	low	high	fuge	page	tune name	other
11	21	dM7	b.p.		082T	Bound for Canaan	
11	21	sD6			448T	Consecration	
11	21	sD6			128	Promised Land, The	
11	21	rD6			027	Bethel	
11	21	rD6			330T	Horton	
11	21	rD6			375	Love the Lord	
11	21	rD6			085	Morning Trumpet, The	
11	21	rD6			026	Samaria	
11	21	rD6			132	Sinner's Friend	
11	21	sd7			173	Phoebus	
11	21	rA5			067	Columbus	
11	21	rA6	b.p.		277	Antioch	
11	21	rA6		fuge	504	Wood Street	
11	21	rA7			416	Christian's Nightly Song, The	
11	21	rA7			367	Consolation	
11	21	rA7			330B	Fellowship	
11	21	rA7		fuge	397	Fountain, The	
11	21	rA7			320	Funeral Anthem	
11	21	rA7	b.p.	fuge	423	Grantville	
11	21	rA7		fuge	286	Heavenly Home	
11	21	rA7		fuge	453	Holly Springs	
11	21	rA7			500	Living Hope	
11	21	rA7		fuge	163T	Morning	
11	21	rA7		fuge	411	Morning Prayer	
11	21	rA7			050T	Mortality	
11	21	rA7		fuge	396	Notes Almost Divine	
11	21	rA7		fuge	224	Save, Lord, or We Perish	
11	21	rA7			487	Soldier's Delight	
11	21	rA7		fuge	142	Stratfield	
11	21	rA7			191	Virginia	
11	21	rA7			038B	Windham	
11	21	rA7		fuge	447	Wondrous Cross	
11	22	fI6			271B	Restoration (Second)	
11	22	fI5			088T	Done With the World	
11	22	fI6		fuge	441	Raymond	
11	22	fI7		fuge	217	Ballstown	
11	22	fI7		fuge	550	Blissful Dawning	
11	22	fI7			169	Dartmouth	
11	22	fI7			139	Elysian	
11	22	fI7		fuge	171	Exhortation (First)	
11	22	fI7			518	Heavenly Anthem	

low	high	mode	b.p.	fuge	page	tune name	
11	22	fI7		fuge	137	Liberty	
11	22	fI7		fuge	218	Mount Pleasant	
11	22	fI7		fuge	485	New Agatite	
11	22	fI7			501	O'Leary	
11	22	fI7		fuge	532	Peace and Joy	
11	22	fI7		fuge	556	Portland	
11	22	fI7		fuge	187	Protection (1)	
11	22	fI7			402	Protection (Second)	
11	22	fI7		fuge	192	Schenectady	
11	22	fI7		fuge	464	Sheppard	
11	22	fI7		fuge	391	Sounding Joy	
11	22	fI7			151	Symphony	
11	22	fI7		fuge	195	Worcester	
11	22	dI7			451	Mary's Grief and Joy	
11	22	dI7			094	Never Part	
11	22	dI7		fuge	431	New Bethany	
11	22	dM5			495	Midnight Cry, The	
11	22	sd7		fuge	211	Whitestown	
11	22	rA7			117	Babylon Is Fallen	
11	22	rA7		fuge	183	Greenwich	
11	22	rA7			048B	Kedron	
11	22	rA7		fuge	440	North Salem	
11	23	fL6	b.p.		093	Frozen Heart	
11	23	fL6			158	Funeral Thought	
11	23	fL6	b.p.		341	Lone Pilgrim, The	
11	23	fL6			498	Resurrection Day, The	
11	23	fL6			275B	Roll On	
11	23	fL6	b.p.		400	Struggle On	
11	23	fI5			499	At Rest	
11	23	fI5			121	Florence	
11	23	fI5			213T	Good Old Way, The	
11	23	fI5			034T	Gospel Pool, The	
11	23	fI5			403	Heavenly Rest	
11	23	fI5			175	Highlands of Heaven	
11	23	fI5			075	I Would See Jesus	
11	23	fI5			282	I'm Going Home	
11	23	fI5			229	Irwinton	
11	23	fI5			285B	Land of Rest	
11	23	fI5			205	Pleasant Hill	
11	23	fI5			152	Shepherds Rejoice	
11	23	fI5			437	Sidney	

mode	b.p.	low	high	fuge	page	tune name	other
11	23	fl5			072T	Weary Souls, The	
11	23	fl6	b.p.		045B	Imandra New	
11	23	fl6			130	Millennium	
11	23	fl6		fuge	186	Sherburne	
11	23	dl6			424	Sweet Union	
11	23	fl7			178	Africa	
11	23	fl7		fuge	553	Anthem on the Beginning	
11	23	fl7		fuge	269	Bear Creek	
11	23	fl7			407	Charlton	
11	23	fl7	b.p.	fuge	432	Cheves	
11	23	fl7			184	Enfield	
11	23	fl7			301	Greenland	
11	23	fl7			156	Jesus Rose	
11	23	fl7			242	Ode On Science	
11	23	fl7		fuge	384	Panting for Heaven	
11	23	fl7		fuge	365	Southwell	
11	23	fl7		fuge	543	Thou Art God	
11	23	rD6	b.p.		421	Sweet Morning	
11	23	rD6			095	Vernon	
11	23	rA7		fuge	196	Alabama	
11	23	rA7		fuge	216	Delight	
11	23	rA7			115	Edmonds	
11	23	rA7		fuge	181	Exit	
11	23	rA7		fuge	197	Georgia	
11	23	rA7			547	Granville	
11	23	rA7		fuge	302	Logan	
11	23	rA7		fuge	110	Mount Vernon	
11	23	rA7			051	My Home (First)	
11	23	rA7			215	New Topia	
11	23	rA7		fuge	481	Novakoski	
11	23	rA7			160B	Turn, Sinner, Turn	
11	23	rA7			180	Vermont	
11	23	rA7		fuge	564	Zion	
11	24	fl7		fuge	120	Chambers	
11	24	fl7		fuge	327	Invitation	
11	24	fl7		fuge	202	New Lebanon	
11	24	fl7			311	Silver Street	
11	24	fl7		fuge	352	Swanton	
11	24	dl7			309	Living Lamb	
11	25	fl7		fuge	220	Mount Zion (First)	

page 52, Fasola Modality : <i>The Sacred Harp</i> (1991)							Range Index, cont.
low	high	mode	b.p.	fuge	page	tune name	
11	25	fl7			174	Petersburg	
11	25	sd7		fuge	442	New Jordan	
11	25	rA7			346	American Star, The	

## A Metrical Index of *The Sacred Harp* (1991)

Meter describes the rhythm of a hymn composed of regular stanzas, or groups of of verses (lines). Each verse within a stanza has a certain number of syllables, the same as or different from the other verses within that stanza. The pattern of accents within each verse of successive stanzas also remains the same. More common meters are given names, listed below with their abbreviations. Less frequently used meters are indicated by series of numbers. The letter D (for “Double”) means to double the preceding series of verses within a stanza.

*Note:* the term “verse” is often (and incorrectly) used to mean “stanza”.

Many older hymnals, including the third (1859) edition of *The Sacred Harp*, include a metrical index. Although by current standards such an index may seem unnecessary or anachronistic, it originally had a very practical function, that of matching texts to music. Instrumental accompaniment was rejected by many churches during the Reformation, and the choice of hymns often depended on the tunes familiar to the congregation. The single text-tune match was a product of the nineteenth century, when, except among groups which continue(d) to refuse its use, the church organ was almost universally accepted. As the fasola tradition is now being recovered, the metrical index may again be of use in matching other, even newly composed, texts to those older settings which are in the public domain.

C.M.	(Common Meter)	8.6.8.6.
C.M.D.	(Common Meter Double)	8.6.8.6.8.6.
C.P.M.	(Common Particular Meter)	8.8.6.8.8.6.
L.M.	(Long Meter)	8.8.8.8.
L.M.D.	(Long Meter Double)	8.8.8.8.8.8.8.
L.P.M.	(Long Particular Meter)	8.8.8.8.8.8.
M.H.	(Meter Hallelujah)	6.6.6.6.8.8.
S.M.	(Short Meter)	6.6.8.6.
S.M.D.	(Short Meter Double)	6.6.8.6.6.8.6.

P.M. (Particular Meter): describes a stanza of rhythmic verses which are of regular though uncustomary lengths, or in an unusual order.

Set Piece: contains rhythmic verses of irregular lengths and in an erratic order, so as to be suitable only for a specific text.

Anthem: musical setting of a prose (having irregular rhythm) text, often from Holy Scripture.

### Distribution of Meters

C.M. = 144	L.M. = 81	M.H. = 3	P.M. = 65
C.M.D. = 55	L.M.D. = 18	S.M. = 33	set piece = 6
C.P.M. = 8	L.P.M. = 3	S.M.D. = 5	anthem = 16
		other = 117	

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
C.M.		fI6	b.p.	138T	Adoration
C.M.		fI7		178	Africa
C.M.		sD6		348T	Ainslie
C.M.	fuge	rA7		196	Alabama
C.M.		fI6	b.p.	493	Amanda Ray
C.M.		fI7		103	Animation
C.M.		rA7		506	Ark, The
C.M.		fI6		073B	Arlington (B)
C.M.		fL6	b.p.	285T	Arnold
C.M.	fuge	fI7		091	Assurance
C.M.		rD6		027	Bethel
C.M.		fI6		420	Bishop
C.M.		fI5		176B	Blooming Youth
C.M.	fuge	fI7		422	Burdette
C.M.	fuge	sd7		300	Calvary
C.M.		dI7		287	Cambridge
C.M.		fI5	.	101T	Canaan's Land
C.M.		fI7		407	Charlton
C.M.		rD6		077T	Child of Grace, The
C.M.		fL6		163B	China
C.M.		fI7		057	Christian Soldier
C.M.		fL6		314	Cleburne
C.M.		rA7		313B	Cobb
C.M.		rA5		067	Columbus
C.M.	fuge	fI7		297	Conversion
C.M.		dI7		230	Converting Grace
C.M.		fI6		063	Coronation
C.M.	fuge	rA7		349	Cross for Me, A
C.M.		sd7		123B	Cross of Christ
C.M.		rA6		039T	Detroit
C.M.		dI6		098	Dull Care
C.M.		fL6	b.p.	398	Dying Boy, The
C.M.		fL6	b.p.	083B	Dying Minister, The
C.M.	fuge	fI7		200	Edom
C.M.		dI7		569T	Emmaus
C.M.		sm6		074T	Enquirer, The
C.M.	fuge	rD6		383	Eternal Day
C.M.	fuge	fI7		336	Eternal Home
C.M.	fuge	fI7		171	Exhortation (First)
C.M.		sD6		029T	Fairfield
C.M.		fI6	b.p.	348B	Fleeting Days
C.M.		fI5		121	Florence

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
C.M.		fI6		389	Fredericksburg
C.M.	fuge	rA7	b.p.	423	Grantville
C.M.	fuge	fI7		198	Green Street
C.M.		fI5		289	Greensborough
C.M.		dM6	b.p.	146	Hallelujah
C.M.	fuge	fI7		573	Harpeth Valley
C.M.	fuge	fI6		371	Heavenly Dove
C.M.	fuge	rA7		286	Heavenly Home
C.M.		fI6	b.p.	303	Heavenly Land
C.M.		fI6		378T	Heavenly Port, The
C.M.		fI5		403	Heavenly Rest
C.M.		fL6		077B	Holcombe
C.M.		rD6		330T	Horton
C.M.		fI6		568	I Want to Go to Heaven
C.M.		fI5		075	I Would See Jesus
C.M.		fI5		229	Irwinton
C.M.		fI6	b.p.	105	Jewett
C.M.		fI7		513	Joyful
C.M.		fI7		426T	Kelley
C.M.		fI5		285B	Land of Rest
C.M.		fL6	b.p.	354T	Lebanon
C.M.	fuge	fI7		137	Liberty
C.M.		fL6	b.p.	037B	Liverpool
C.M.		dI7		309	Living Lamb
C.M.		fL6		235	Long Sought Home
C.M.		rD6		278T	Love Shall Never Die
C.M.		rD6		375	Love the Lord
C.M.		fI6		124	Lover of the Lord
C.M.	fuge	fI7		228	Marlborough
C.M.	fuge	fI7		517	Mars Hill
C.M.		fI6		049B	Mear
C.M.	fuge	rD6		419	Melancholy Day
C.M.		rA6	b.p.	131T	Messiah
C.M.	fuge	fI6		273	Milford
C.M.		fL6		069T	Minister's Farewell
C.M.	fuge	fI7		189	Montgomery
C.M.	fuge	fI7		304	Morgan
C.M.	fuge	fI6		474	Mount Desert
C.M.	fuge	fI7		218	Mount Pleasant
C.M.		fI6	b.p.	088B	Mount Zion (Second)
C.M.	fuge	fI7		546	My Brightest Days
C.M.		rA7		051	My Home (First)

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
C.M.		fI7		350	Nativity
C.M.		dI7		094	Never Part
C.M.	fuge	fI7		485	New Agatite
C.M.		fI5		045T	New Britain
C.M.	fuge	fI7		299	New Jerusalem
C.M.		fI5		390	New Prospect
C.M.		rA7		215	New Topia
C.M.		fI5		321	Newnan
C.M.	fuge	fI6		036B	Ninety-Fifth
C.M.	fuge	rA7		440	North Salem
C.M.	fuge	fI7		155	Northfield
C.M.	fuge	fI7		362	Norwich
C.M.	fuge	fI7		222	Ocean
C.M.		fI6		295	Odem (First)
C.M.		fI5		138B	Ogletree
C.M.		fI6	b.p.	068B	Ortonville
C.M.	fuge	fI7		306	Oxford
C.M.		fL6		414	Parting Friend
C.M.		lP7		308	Parting Friends (Second)
C.M.		fL6		445	Passing Away
C.M.		fI6	b.p.	387	Penick
C.M.		sd7		173	Phoebus
C.M.		rA6		201	Pilgrim
C.M.		fL6		058	Pisgah
C.M.	fuge	fI7		351	Pittsford
C.M.		fI5		205	Pleasant Hill
C.M.		fI5		162	Plenary
C.M.		rA7		086	Poland
C.M.		fI6		047T	Primrose
C.M.		fI6		043	Primrose Hill
C.M.		dI7		113	Prodigal Son, The
C.M.		fI5		409	Promised Day
C.M.		sD6		128	Promised Land, The
C.M.	fuge	fI7		187	Protection (1)
C.M.		fI5		298	Providence
C.M.	fuge	fI7		344	Rainbow
C.M.	fuge	fI6		441	Raymond
C.M.		fL6		418	Rees
C.M.		fI6	b.p.	225T	Reynolds
C.M.		fI6	b.p.	569B	Sacred Throne
C.M.		sd7		114	Saint's Delight, The
C.M.		fI5		471	Savior's Name, The

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
C.M.		fI5		039B	Sharpsburg
C.M.		fI5		152	Shepherds Rejoice
C.M.	fuge	fI6		186	Sherburne
C.M.		dI7		461	Shining Star
C.M.		fI5		437	Sidney
C.M.		fI5		381	Sing On
C.M.		fI7		325	Soldier of the Cross
C.M.		rA7		379	Span of Life
C.M.		sD6	b.p.	065	Sweet Prospect
C.M.		fI7		061	Sweet Rivers
C.M.	fuge	fL6	b.p.	475	Thankful Heart, A
C.M.	fuge	fI7		543	Thou Art God
C.M.		rD6		029B	Tribulation
C.M.		rA7		191	Virginia
C.M.		fI5		072T	Weary Souls, The
C.M.		dI7		310	Weeping Savior (Second)
C.M.		dM6		288	White
C.M.		fI7		038T	Winter
C.M.D.	fuge	fI7		293	Akers
C.M.D.	fuge	rD6		430	Arbacoochee
C.M.D.		rA7		126	Babel's Streams
C.M.D.	fuge	fI7		292	Behold the Savior
C.M.D.	fuge	fI6		386	Christ Our Song
C.M.D.		fI7		177	Christian's Flight, The
C.M.D.		rA7		367	Consolation
C.M.D.		dM6		044	Converted Thief, The
C.M.D.		fI6		382	Coston
C.M.D.		fI7		184	Enfield
C.M.D.	fuge	fI6		483	Eternal Light
C.M.D.		fL6		462	Faith and Hope
C.M.D.		fI5		570	Farewell to All (Second)
C.M.D.	fuge	rA7		397	Fountain, The
C.M.D.	fuge	rA7		197	Georgia
C.M.D.	fuge	fI7		530	Glad New Song, A
C.M.D.		fI7		301	Greenland
C.M.D.	fuge	fI7		466	Haynes Creek
C.M.D.	fuge	rA7		453	Holly Springs
C.M.D.		fI6		541	Home of the Blest
C.M.D.		fI7		373	Homeward Bound
C.M.D.		fI7		446	Infinite Day
C.M.D.	fuge	lP7		562	Infinite Delight

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
C.M.D.		dI7		066	Jordan (First)
C.M.D.	fuge	fI7		439	Jordan (Second)
C.M.D.	fuge	fL6		112	Last Words of Copernicus
C.M.D.		sd7		071	Leander
C.M.D.		rA7		500	Living Hope
C.M.D.		fI7		291	Majesty
C.M.D.	fuge	fI7		392	Manchester
C.M.D.		fI7		438	Marriage in the Skies, The
C.M.D.	fuge	rA7		433	McKay
C.M.D.	fuge	rA7		411	Morning Prayer
C.M.D.	fuge	fI7		527	My Life and Breath
C.M.D.	fuge	fI7		478	My Rising Sun
C.M.D.		fI6	b.p.	490	My Shepherd Guides
C.M.D.	fuge	fI7		395	New Bethel
C.M.D.	fuge	fI7		534	New Georgia
C.M.D.	fuge	sd7		442	New Jordan
C.M.D.	fuge	fI7		340	Odem (Second)
C.M.D.		fI7		463	Our Humble Faith
C.M.D.		fI7		521	Parting Friends (Third)
C.M.D.		dI6		143	Pleyel's Hymn (First)
C.M.D.		rD6	b.p.	328	Praise God
C.M.D.	fuge	sd7		214	Repentance
C.M.D.	fuge	fI7		283	Sabbath Morning
C.M.D.		fI7		456	Sacred Mount
C.M.D.		rA7		296	Sardinia
C.M.D.	fuge	fI7		279	Shepherd's Flock, The
C.M.D.	fuge	fI7		528	Showers of Blessings
C.M.D.		fI5		055	Sister's Farewell
C.M.D.	fuge	rA7		536	Sweet Majesty
C.M.D.		fI6		476	Throne of Grace, The
C.M.D.		rA7		180	Vermont
C.M.D.	fuge	rA7		564	Zion
C.P.M.		fI7		096	Few Happy Matches
C.P.M.		fI5		284	Garden Hymn
C.P.M.	fuge	fI7		172	Harmony
C.P.M.		fL6		266	Kingwood
C.P.M.		fL6		064	Nashville
C.P.M.	fuge	rA7		396	Notes Almost Divine
C.P.M.	fuge	fI7		365	Southwell
C.P.M.		fI7		368	Stony Point

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
L.M.	fuge	fI7		472	Akin
L.M.		rD6		271T	Arkansas
L.M.	fuge	fI7		217	Ballstown
L.M.	fuge	fI7		269	Bear Creek
L.M.	fuge	fI7		276	Bridgewater
L.M.		fI7		479	Chester
L.M.	fuge	fI7	b.p.	432	Cheves
L.M.		sd7		240	Christian Song
L.M.		rA7		042	Clamanda
L.M.		fI7		270	Confidence
L.M.		fI6		032T	Corinth
L.M.	fuge	rD6		168	Cowper
L.M.		dM5		073T	Cusseta
L.M.		fI5		060	Day of Worship
L.M.		fI5		048T	Devotion
L.M.		rA5		032B	Distress
L.M.		fI6		531	Dura
L.M.		sd7		082B	Edgefield
L.M.		fI5		037T	Ester
L.M.	fuge	rA7		377	Eternal Praise
L.M.		fL6		170	Exhilaration
L.M.	fuge	sD6		272	Exhortation (Second)
L.M.	fuge	rA7		181	Exit
L.M.		rD6	b.p.	069B	Farewell to All (First)
L.M.		fI7		515	Federal Street
L.M.		fL6	b.p.	093	Frozen Heart
L.M.		fI5		213T	Good Old Way, The
L.M.		rA7		547	Granville
L.M.	fuge	fI6		511	Great Redeemer
L.M.		fI6		127	Green Fields
L.M.	fuge	rA7		183	Greenwich
L.M.	fuge	fI7		538	Hampton
L.M.		fI6	b.p.	343	Happy Home
L.M.		fI7		566	Hebron
L.M.	fuge	fI7		193	Huntington
L.M.		fI5		282	I'm Going Home
L.M.	fuge	rA7		315	Immensity
L.M.		fI5		317	Jackson
L.M.	fuge	sD6		053	Jerusalem
L.M.		rA7		048B	Kedron
L.M.		fI6		104	Lovely Story, The
L.M.		sD6		275T	Loving-Kindness

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
L.M.	fuge	fI7		353	McGraw
L.M.		fI5		204	Mission
L.M.	fuge	rA7		163T	Morning
L.M.		rA7		050T	Mortality
L.M.	fuge	rA7		110	Mount Vernon
L.M.	fuge	dI7		431	New Bethany
L.M.		fI7		412	New Hosanna
L.M.		sD6		324	North Port
L.M.		fI7		242	Ode On Science
L.M.		fL6		374	Oh, Sing With Me!
L.M.		fI7		049T	Old Hundred
L.M.		fI5		062	Parting Hand
L.M.		fL6		549	Phillips Farewell
L.M.	fuge	fI7		556	Portland
L.M.		fI5		544	Praise Him
L.M.	fuge	fI7	b.p.	318	Present Joys
L.M.		fI5		030B	Prospect
L.M.		fL6		271B	Restoration (Second)
L.M.		fL6		275B	Roll On
L.M.	fuge	sD6		107	Russia
L.M.		fI6		435	Sacred Rest
L.M.		sd7		068T	Salem
L.M.	fuge	fI7		192	Schenectady
L.M.		rA7		487	Soldier's Delight
L.M.	fuge	rA7		142	Stratfield
L.M.		rD6		539	Supplication
L.M.	fuge	fI7		352	Swanton
L.M.		fI7		140	Sweet Solitude
L.M.		fI5		111B	To Die No More
L.M.	fuge	fI7		208	Traveling On
L.M.		rA7		160B	Turn, Sinner, Turn
L.M.		fI5		097	We'll Soon Be There
L.M.		dI7		028B	Wells
L.M.		fI7		280	Westford
L.M.	fuge	sD6		505	Where Ceaseless Ages Roll
L.M.	fuge	sd7		211	Whitestown
L.M.		rA7		038B	Windham
L.M.	fuge	rA6		504	Wood Street
L.M.		fI6		404	Youth will soon be Gone
L.M.D.	fuge	rA7		444	All Saints New
L.M.D.		fI7		486	Beneficence

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
L.M.D.	fuge	fI7		468	Bristol
L.M.D.		fI5		516	DeLong
L.M.D.		dI7		164	Duane Street
L.M.D.	fuge	fL6		434	Fillmore
L.M.D.	fuge	fI7		327	Invitation
L.M.D.	fuge	fI7		380	Lawrenceburg
L.M.D.	fuge	fI6		558	Living Streams
L.M.D.	fuge	fI6		470	Mercy Seat, The
L.M.D.	fuge	fI7		436	Morning Sun
L.M.D.	fuge	fI6	b.p.	316	New Hope
L.M.D.	fuge	fI7		384	Panting for Heaven
L.M.D.		fI7		174	Petersburg
L.M.D.		rD6		026	Samaria
L.M.D.		fI7	b.p.	465	Where There's No Trouble and Sorrow
L.M.D.	fuge	rA7		447	Wondrous Cross
L.M.D.	fuge	rA7		522	Ye Heedless Ones
L.P.M.		sD6		448T	Consecration
L.P.M.	fuge	fI7		202	New Lebanon
L.P.M.		rD6		095	Vernon
S.M.		fL6		033B	Abbeville
S.M.		fI6		052T	Albion
S.M.	fuge	rD6		036T	America
S.M.		fI5		499	At Rest
S.M.		rA7		028T	Aylesbury
S.M.		dM7		147T	Boylston
S.M.		fI7		313T	Concord (2)
S.M.	fuge	rA7		209	Evening Shade
S.M.		rA7		330B	Fellowship
S.M.		rD6		385T	Fight On
S.M.	fuge	rD6		203	Florida
S.M.		fI5		034T	Gospel Pool, The
S.M.		dI6		565	Hill of Zion, The
S.M.	fuge	rA7		542	I'll Seek His Blessings
S.M.		rA5		047B	Idumea
S.M.		fI7		147B	Laban
S.M.		fI6		467	Lisbon
S.M.		dI7		503	Lloyd
S.M.	fuge	fI7		220	Mount Zion (First)
S.M.		fI7		182	Newburgh
S.M.		fL6	b.p.	031T	Ninety-Third Psalm

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
S.M.	fuge	rA7		481	Novakoski
S.M.		fI7		501	O'Leary
S.M.		lP5		535	Shawmut
S.M.	fuge	fI7		464	Sheppard
S.M.		fI7		311	Silver Street
S.M.		rD6		312T	Sing to Me of Heaven!
S.M.	fuge	fI7		391	Sounding Joy
S.M.		fI6		34B	St. Thomas
S.M.	fuge	dI6		078	Stafford
S.M.		fL6	b.p.	031B	Webster
S.M.		rD6		033T	Weeping Savior (First)
S.M.	fuge	rA7		428	World Unknown
S.M.D.		fI7		502	Charge to Keep, A
S.M.D.		fI7		169	Dartmouth
S.M.D.		fI7		540	Nidrah
S.M.D.	fuge	rA7		372	Rockport
S.M.D.	fuge	fI7		195	Worcester
M.H.		fI6		473	Carmarthen
M.H.	fuge	rA7		216	Delight
M.H.	fuge	fL6		040	Lenox
6.6.8.D.	fuge	fI7		150	Amity
6.6.8.D.	fuge	fI7		120	Chambers
6.6.8.D.	fuge	fI7		212	Sharon
7.6.7.6.		dM7	b.p.	082T	Bound for Canaan
7.6.7.6.		fI5		092	Burk
7.6.7.6.		rA5		106	Ecstasy
7.6.7.6.		rA7		115	Edmonds
7.6.7.6.		fI6		448B	Grieved Soul, The
7.6.7.6.		dM5		129	Heavenly Armour
7.6.7.6.		rA6	b.p.	101B	Holy City
7.6.7.6.		rD6		085	Morning Trumpet, The
7.6.7.6.		fI5		410B	Mutual Love
7.6.7.6.		fI6	b.p.	319	Religion is a Fortune
7.6.7.6.D		dI6		084	Amsterdam
7.6.7.6.D.		fL6	b.p.	141	Complainier
7.6.7.6.D.		fI7		157	Essay

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
7.7.7.7.		fI6	b.p.	081B	Cookham
7.7.7.7.		fI7		510	Corley
7.7.7.7.		fI7		415	Easter Morn
7.7.7.7.		dI6		070T	Gainsville
7.7.7.7.		fI7		050B	Humility
7.7.7.7.		sD6		074B	King of Peace
7.7.7.7.		fI6		405	Marcellas, The
7.7.7.7.		fI7		497	Natick
7.7.7.7.		dI7		523	Pleyel's Hymn (Second)
7.7.7.7.		rA6	b.p.	108B	Traveler, The
7.7.7.7.		fI5		108T	Weeping Sinners
7.7.7.7.D		dI7		450	Elder
7.7.7.7.D		fI6		452	Martin
7.7.7.7.D		dI7		451	Mary's Grief and Joy
8.6.8.6.8.8.8.6.		fI7		122	All Is Well
8.6.8.6.8.8.8.6.	fuge	fI7		550	Blissful Dawning
8.7.8.7.		fI5		081T	Beach Spring
8.7.8.7.		dI7		054	Blessed Lamb, The
8.7.8.7.		fL6		359	Bride's Farewell, The
8.7.8.7.		fI7		052B	Charlestown
8.7.8.7.		dM5		089	Church's Desolation, The
8.7.8.7.		fI5		056T	Columbiana
8.7.8.7.		fL6	b.p.	410T	Dying Californian, The
8.7.8.7.		fI7		333	Family Circle
8.7.8.7.		sD6		458	Friendship
8.7.8.7.		fI5		059	Holy Manna
8.7.8.7.		fI6		144	Jubilee
8.7.8.7.		fL6		090	Look Out
8.7.8.7.		dM5		207	Louisiana
8.7.8.7.		fI7		030T	Love Divine
8.7.8.7.		rD6		370	Monroe
8.7.8.7.		fL6		323T	Mullins
8.7.8.7.		fI5		406	New Harmony
8.7.8.7.		fI7		135	Olney
8.7.8.7.		rD6	b.p.	545	Pilgrim's Way, The
8.7.8.7.		fI7		154	Rest for the Weary
8.7.8.7.		rA5		312B	Restoration (First)
8.7.8.7.		sd7		080T	Shouting Song
8.7.8.7.		sd7		332	Sons of Sorrow

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
8.7.8.7.		fI5		166	Still Better
8.7.8.7.		fI6		145B	Sweet Affliction
8.7.8.7.		sD5		056B	Villulia
8.7.8.7.		fL6	b.p.	145T	Warrenton
8.7.8.7.D.		sD6		148	Jefferson
8.7.8.7.D	fuge	fI7		532	Peace and Joy
8.7.8.7.D		rD6		118	Stockwood
8.7.8.7.4.7.		sD6		385T	Can I Leave You?
8.7.8.7.4.7.		fI7		263	Doddridge
8.7.8.7.4.7.		fL6		335	Return Again
8.8.		rA6	b.p.	277	Antioch
8.8.		sd7		429	Christian's Delight
8.8.		fI5		076B	Desire for Piety
8.8.		fI5		088T	Done With the World
8.8.		rA5		274T	Golden Harp, The
8.8.		sD6		345B	I'm On My Journey Home
8.8.		fL6	b.p.	345T	Jesus Is My Friend
8.8.		fI5		111T	Journey Home
8.8.		rD6		378B	Never Turn Back
8.8.		fL6		176T	Ragan
8.8.		fI5		274B	Roll Jordan
8.8.		rA5		070B	Save, Mighty Lord
8.8.		fI6	b.p.	080B	Service of the Lord
8.8.		rD6		132	Sinner's Friend
8.8.		fL6	b.p.	400	Struggle On
8.8.		dl6		087	Sweet Canaan
8.8.		rD6	b.p.	421	Sweet Morning
8.8.		dl6		424	Sweet Union
8.8.		sm6		278B	Traveling Pilgrim
8.8.8.6.		fI7	b.p.	206	Christian's Hope
8.8.8.6.		rA6	b.p.	399T	Dying Friend, The
8.8.8.6.		fI5		153	Resurrected
8.8.8.6.D.		fI6		134	Christian's Hope, The
8.8.8.8.8.4.	fuge	fI7		099	Gospel Trumpet
8.8.8.8.8.4.	fuge	fI7		460	Sardis
9.7.9.7.		fI6		494	Big Creek
9.7.9.7.		fI7	b.p.	322	Man's Redemption

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
9.8.9.8.		rA7		102	Fulfilment
9.8.9.8.		fL6	b.p.	338	Sawyer's Exit
9.8.9.8.D.		dI6		449	Fatherland
9.8.9.8.D.		rA5		376	Help Me To Sing
9.8.9.8.D.		rA6		267	Parting Friends (First)
9.8.9.8.D.		rD6	b.p.	457	Wayfaring Stranger
10.10.		fI6		388	Happy Sailor, The
10.10.		fI5		079	Old Ship of Zion, The
11.8.11.8.		fI6	b.p.	123T	Dying Christian, The
11.8.11.8.		fL6	b.p.	341	Lone Pilgrim, The
11.8.11.8.		fI7		413	Loved Ones, The
11.8.11.8.		fI7		571	Penitence
11.11.11.11.		fI5		072B	Bellevue
11.11.11.11.		fI7	b.p.	100	Bower of Prayer, The
11.11.11.11.		rA7		125	Expression
11.11.11.11.		fL6	b.p.	119	Heaven's My Home
11.11.11.11.		fI6	b.p.	045B	Imandra New
11.11.11.11.		dI7		136	Morality
11.11.11.11.		fI7		358	Murillo's Lesson
11.11.11.11.		fI7		496	Rock That Is Higher Than I, The
11.11.11.11.		dI7		161	Sweet Home
11.11.11.11.		sm6		160T	War Department
12.11.12.11.		rA7		346	American Star, The
12.11.12.11.		rA7		165	Family Bible
12.11.12.11.		sD6	b.p.	360	Royal Band, The
P.M. (6.4.6.4.6.7.6.4.)		fI5		354B	Happy Land
P.M. (6.6.4.)		fL6	b.p.	213B	Warning
P.M. (6.6.6.6.)		fI6		489	Savior's Call, The
P.M. (6.6.6.6.8.4.6.)	fuge	rA7		455	Soar Away
P.M. (6.6.8.6.6.6.8.6.8.6.)	fuge	rA7		302	Logan
P.M. (6.6.9.D.)		rA5		399B	Happy Christian
P.M. (6.6.10.D.)		rA7		416	Christian's Nightly Song, The
P.M. (6.6.10.2.6.8.)		fI6		394	Messiah's Praise, The
P.M. (6.7.6.7.)		fI5		175	Highlands of Heaven
P.M. (6.10.6.10.6.10.8.6.)		fL6		498	Resurrection Day, The
P.M. (7.3.7.5.3.3.6.8.)		fI6		046	Let Us Sing

page 66, Fasola Modality : <i>The Sacred Harp</i> (1991)					Metrical Index, cont.
<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
P.M. (7.6.)		f15		294	Rocky Road
P.M. (7.6.6.4.)		f15		331	Jester
P.M. (7.6.7.6.7.6.7.7.)		dM5		495	Midnight Cry, The
P.M. (7.6.7.6.7.7.7.6.)		f16		131B	Invocation (First)
P.M. (7.6.7.6.7.7.7.7.)		f17		139	Elysian
P.M. (7.6.7.6.8.6.7.6.)		rA7		083T	Vale of Sorrow
P.M. (7.6.7.7.)		f17		323B	Soft Music
P.M. (7.6.8.8.8.6.)		lA6	b.p.	133	Hebrew Children
P.M. (7.7.)		fL6	b.p.	425	Golden Streets
P.M. (7.7.7.6.D.)		f15		109	Carnsville
P.M. (7.7.7.6.7.7.7.)		f16		477	Lord, We Adore Thee
P.M. (7.7.7.D.)		f16	b.p.	076T	Holiness
P.M. (7.7.8.6.10.8.6.6.8.6.)		f16		560	My Home (Second)
P.M. (7.7.9.7.7.8.)		f15		491	Oh, What Love
P.M. (7.9.7.9.)		sD6		326	Weary Pilgrim
P.M. (8.10.8.6.5.)		f17		347	Christian's Farewell
P.M. (8.6.)		fL6		290	Victoria
P.M. (8.6.10.8.8.8.6.)		f17		492	Invocation (Second)
P.M. (8.6.8.6.8.6.)		f16		393	Alexander
P.M. (8.6.8.6.8.10.12.8.6.8.6.)		f17		426B	Jasper
P.M. (8.7.8.7.8.7.)		rA7		117	Babylon Is Fallen
P.M. (8.8.7.D.)		sd7		210	Lena
P.M. (8.8.8.6.6.10.8.)	fuge	f17		454	Better Land, The
P.M. (8.8.8.8.7.)		f16	b.p.	484	Heavenly Union
P.M. (8.8.8.8.7.7.)		f17		188	Spring
P.M. (8.8.8.8.8.)		f15		482	Mulberry Grove
P.M. (8.8.8.8.8.8.4.)		f15		329	Vain World Adieu
P.M. (8.8.8.8.8.8.8.)		f17		402	Protection (Second)
P.M. (8.8.8.8.8.D.)		f17		488	As We Go On
P.M. (8.9.8.10.10.10.10.8.8.)		f16		548	Wootten
P.M. (9.10.9.10.)		f17		041	Home in Heaven
P.M. (9.6.7.10.)		fL6		035	Saints Bound for Heaven, The
P.M. (9.6.9.6.8.8.8.6.)		f15		337	Mercy's Free
P.M. (9.6.9.6.D.)		f16		480	Redemption
P.M. (9.8.8.8.)		fL6	b.p.	401	Cuba
P.M. (12.11.12.11.11.11.11.11.)		dM6	b.p.	179	Christian Warfare, The
P.M. (13.11.12.12.)		fL6		158	Funeral Thought
P.M. (12.10.10.10.)		sD6		567	Great Day, The
P.M. (11.12.12.12.12.12.)	fuge	f17		551	Jacob's Vision
P.M. (12.12.12.13.)		f16		130	Millennium
P.M. (12.8.8.8.6.)		f17		334	O Come Away
P.M. (12.11.12.11.D.)		fL6		342	Old-Fashioned Bible, The

<b>meter</b>	<b>fuge</b>	<b>mode</b>	<b>b.p.</b>	<b>page</b>	<b>tune name</b>
P.M. (12.8.8.8.)		fI7		185	Pilgrim's Farewell
P.M. (11.11.11.10.)		fI7		223	Portuguese Hymn
P.M. (12.12.12.12.)	fuge	rA7		224	Save, Lord, or We Perish
P.M. (10.11.10.11.)		fI7		369	Send a Blessing
P.M. (10.10.10.D.)		fI7		151	Symphony
P.M. (12.11.11.12.)		fI7		231	Thou Art Passing Away
P.M. (10.10.4.10.10.10.4.)		fI5		459	Tolling Bell
P.M. (11.12.12.12.)		fI7		149	Trumpet, The
P.M. (12.8.12.8.)		rA7		116	Union
P.M. (10.13.11.13)		dM5		417	Weeping Pilgrim
P.M. (10.10.10.10.10.)		fI6		339	When I Am Gone
P.M. (12.9.12.12.9.)		sm6		159	Wondrous Love
Set Piece		sd7		245	Claremont
Set Piece		fI7		156	Jesus Rose
Set Piece		dI7		361	Loving Jesus
Set Piece		fI7		167	Pray, Brethren, Pray
Set Piece		fL6		512	Spirit Shall Return, The
Set Piece		fL6		408	Weeping Mary
Anthem		fI7		524	Twenty-Thirrd Psalm, The
Anthem	fuge	fI7		553	Anthem on the Beginning
Anthem		rD6		355	Anthem on the Saviour
Anthem		fI7		232	Baptismal Anthem
Anthem		fI6		225B	Christmas Anthem
Anthem		sD6		268	David's Lamentation
Anthem		fI6		236	Easter Anthem
Anthem	fuge	sd7		260	Farewell Anthem
Anthem		rA7		320	Funeral Anthem
Anthem		fI7		518	Heavenly Anthem
Anthem	fuge	dI7		250	Heavenly Vision
Anthem		fI7		572	Lamb of God, The
Anthem		fI7		227	Ode of Life's Journey
Anthem		fI7		234	Reverential Anthem
Anthem		dI7		254	Rose of Sharon
Anthem		fI7		507	Sermon on the Mount

fuge	mode	b.p.	page	tune name	meter
fuge	fI7		293	Akers	C.M.D.
fuge	fI7		472	Akin	L.M.
fuge	rA7		196	Alabama	C.M.
fuge	rA7		444	All Saints New	L.M.D.
fuge	rD6		036T	America	S.M.
fuge	fI7		150	Amity	6.6.8.D.
fuge	fI7		553	Anthem on the Beginning	Anthem
fuge	rD6		430	Arbacoochee	C.M.D.
fuge	fI7		091	Assurance	C.M.
fuge	fI7		217	Ballstown	L.M.
fuge	fI7		269	Bear Creek	L.M.
fuge	fI7		292	Behold the Savior	C.M.D.
fuge	fI7		454	Better Land, The	P.M. (8.8.8.6.6.10.8.)
fuge	fI7		550	Blissful Dawning	8.6.8.6.8.8.6.
fuge	fI7		276	Bridgewater	L.M.
fuge	fI7		468	Bristol	L.M.D.
fuge	fI7		422	Burdette	C.M.
fuge	sd7		300	Calvary	C.M.
fuge	fI7		120	Chambers	6.6.8.D.
fuge	fI7	b.p.	432	Cheves	L.M.
fuge	fI6		386	Christ Our Song	C.M.D.
fuge	fI7		297	Conversion	C.M.
fuge	rD6		168	Cowper	L.M.
fuge	rA7		349	Cross for Me, A	C.M.
fuge	rA7		216	Delight	M.H.
fuge	fI7		200	Edom	C.M.
fuge	rD6		383	Eternal Day	C.M.
fuge	fI7		336	Eternal Home	C.M.
fuge	fI6		483	Eternal Light	C.M.D.
fuge	rA7		377	Eternal Praise	L.M.
fuge	rA7		209	Evening Shade	S.M.
fuge	fI7		171	Exhortation (First)	C.M.
fuge	sD6		272	Exhortation (Second)	L.M.
fuge	rA7		181	Exit	L.M.
fuge	sd7		260	Farewell Anthem	Anthem
fuge	fL6		434	Fillmore	L.M.D.
fuge	rD6		203	Florida	S.M.
fuge	rA7		397	Fountain, The	C.M.D.
fuge	rA7		197	Georgia	C.M.D.
fuge	fI7		530	Glad New Song, A	C.M.D.
fuge	fI7		099	Gospel Trumpet	8.8.8.8.4.
fuge	rA7	b.p.	423	Grantville	C.M.

## Fuging Tunes, cont.

Fasola Modality : *The Sacred Harp* (1991), page 69

fuge	mode	b.p.	page	tune name	meter
fuge	fl6		511	Great Redeemer	L.M.
fuge	fl7		198	Green Street	C.M.
fuge	rA7		183	Greenwich	L.M.
fuge	fl7		538	Hampton	L.M.
fuge	fl7		172	Harmony	C.P.M.
fuge	fl7		573	Harpeth Valley	C.M.
fuge	fl7		466	Haynes Creek	C.M.D.
fuge	fl6		371	Heavenly Dove	C.M.
fuge	rA7		286	Heavenly Home	C.M.
fuge	dI7		250	Heavenly Vision	Anthem
fuge	rA7		453	Holly Springs	C.M.D.
fuge	fl7		193	Huntington	L.M.
fuge	rA7		542	I'll Seek His Blessings	S.M.
fuge	rA7		315	Immensity	L.M.
fuge	lP7		562	Infinite Delight	C.M.D.
fuge	fl7		327	Invitation	L.M.D.
fuge	fl7		551	Jacob's Vision	P.M. (11.12.12.12.12.12.)
fuge	fl7		426B	Jasper	P.M. (8.6.8.6.8.10.12.8.6.8.6)
fuge	sD6		053	Jerusalem	L.M.
fuge	fl7		439	Jordan (Second)	C.M.D.
fuge	fL6		112	Last Words of Copernicus	C.M.D.
fuge	fl7		380	Lawrenceburg	L.M.D.
fuge	fL6		040	Lenox	M.H.
fuge	fl7		137	Liberty	C.M.
fuge	fl6		558	Living Streams	L.M.D.
fuge	rA7		302	Logan	P.M. (6.6.8.6.6.8.6.8.6.)
fuge	fl7		392	Manchester	C.M.D.
fuge	fl7		228	Marlborough	C.M.
fuge	fl7		517	Mars Hill	C.M.
fuge	fl7		353	McGraw	L.M.
fuge	rA7		433	McKay	C.M.D.
fuge	rD6		419	Melancholy Day	C.M.
fuge	fl6		470	Mercy Seat, The	L.M.D.
fuge	fl6		273	Milford	C.M.
fuge	fl7		189	Montgomery	C.M.
fuge	fl7		304	Morgan	C.M.
fuge	rA7		163T	Morning	L.M.
fuge	rA7		411	Morning Prayer	C.M.D.
fuge	fl7		436	Morning Sun	L.M.D.
fuge	fl6		474	Mount Desert	C.M.
fuge	fl7		218	Mount Pleasant	C.M.
fuge	rA7		110	Mount Vernon	L.M.

fuge	mode	b.p.	page	tune name	meter
fuge	fl7		220	Mount Zion (First)	S.M.
fuge	fl7		546	My Brightest Days	C.M.
fuge	fl7		527	My Life and Breath	C.M.D.
fuge	fl7		478	My Rising Sun	C.M.D.
fuge	fl7		485	New Agatite	C.M.
fuge	dl7		431	New Bethany	L.M.
fuge	fl7		395	New Bethel	C.M.D.
fuge	fl7		534	New Georgia	C.M.D.
fuge	fl6	b.p.	316	New Hope	L.M.D.
fuge	fl7		299	New Jerusalem	C.M.
fuge	sd7		442	New Jordan	C.M.D.
fuge	fl7		202	New Lebanon	L.P.M.
fuge	fl6		036B	Ninety-Fifth	C.M.
fuge	rA7		440	North Salem	C.M.
fuge	fl7		155	Northfield	C.M.
fuge	fl7		362	Norwich	C.M.
fuge	rA7		396	Notes Almost Divine	C.P.M.
fuge	rA7		481	Novakoski	S.M.
fuge	fl7		222	Ocean	C.M.
fuge	fl7		340	Odem (Second)	C.M.D.
fuge	fl7		306	Oxford	C.M.
fuge	fl7		384	Panting for Heaven	L.M.D.
fuge	fl7		532	Peace and Joy	8.7.8.7.D
fuge	fl7		351	Pittsford	C.M.
fuge	fl7		556	Portland	L.M.
fuge	fl7	b.p.	318	Present Joys	L.M.
fuge	fl7		187	Protection (1)	C.M.
fuge	fl7		344	Rainbow	C.M.
fuge	fl6		441	Raymond	C.M.
fuge	sd7		214	Repentance	C.M.D.
fuge	rA7		372	Rockport	S.M.D.
fuge	sD6		107	Russia	L.M.
fuge	fl7		283	Sabbath Morning	C.M.D.
fuge	fl7		460	Sardis	8.8.8.8.4.
fuge	rA7		224	Save, Lord, or We Perish	P.M. (12.12.12.12.)
fuge	fl7		192	Schenectady	L.M.
fuge	fl7		212	Sharon	6.6.8.D.
fuge	fl7		279	Shepherd's Flock, The	C.M.D.
fuge	fl7		464	Sheppard	S.M.
fuge	fl6		186	Sherburne	C.M.
fuge	fl7		528	Showers of Blessings	C.M.D.
fuge	rA7		455	Soar Away	P.M. (6.6.6.6.8.4.6.)

fuge	mode	b.p.	page	tune name	meter
fuge	fI7		391	Sounding Joy	S.M.
fuge	fI7		365	Southwell	C.P.M.
fuge	dI6		078	Stafford	S.M.
fuge	rA7		142	Stratfield	L.M.
fuge	fI7		352	Swanton	L.M.
fuge	rA7		536	Sweet Majesty	C.M.D.
fuge	fL6	b.p.	475	Thankful Heart, A	C.M.
fuge	fI7		543	Thou Art God	C.M.
fuge	fI7		208	Traveling On	L.M.
fuge	sD6		505	Where Ceaseless Ages Roll	L.M.
fuge	sd7		211	Whitestown	L.M.
fuge	rA7		447	Wondrous Cross	L.M.D.
fuge	rA6		504	Wood Street	L.M.
fuge	fI7		195	Worcester	S.M.D.
fuge	rA7		428	World Unknown	S.M.
fuge	rA7		522	Ye Heedless Ones	L.M.D.
fuge	rA7		564	Zion	C.M.D.

## Glossary

The following definitions are offered for the terms employed in the present study and in discussion of the topic in general. The latter are included to encourage further interest in the subject. Closer examination will reveal a depth and richness in fasola hymnody equal to or surpassing that of songs composed or arranged according to conventional standards.

**NB:** an apostrophe ' after a note locates it in the octave above the tonic in a scale, e.g. *do-sol-re'*

**acoustics:** the science of sound, including the production of sounds (manner, environment etc.)

**Aeolian mode:** tonic is *la*; the common practice “minor” scale, with semitones between the 2<sup>nd</sup>-3<sup>rd</sup> and 5<sup>th</sup>-6<sup>th</sup> degrees

**ambit:** the range of a musical scale

**augmented fourth:** one half step above a perfect fourth, e.g. *fa-ti*; enharmonic with a diminished fifth

**authentic range:** defined by Guido (see below) as extending from the tonic to the octave

**cadence:** concluding phrase of a melody or of a section within a melody

**cent:** acoustic unit of measurement used to identify fixed pitches

**chromatic:** describes the scale composed of twelve semitones in succession

**Church Modes:** the system devised by Guido d'Arezzo (c. 1025), and elaborated by Glarean (1547)

**Cooper book:** a revision of *The Sacred Harp* (1844) first published in 1902 by W. M. Cooper of Dothan, Alabama; subsequent editions remain one of the two revisions still in common use.

**counterpoint:** the simultaneous sounding (singing) of two or more separate lines of music; cf. harmony

**degree:** particular number among the sequential notes of a scale, e.g. 3<sup>rd</sup>, 5<sup>th</sup> etc.

**Denson book:** a revision of *The Sacred Harp* (1844) first edited by Joe S. James in 1911, and thereafter by members of the Denson family in Alabama; Thomas J. Denson established the Sacred Harp Publishing Company (now in Bremen, Georgia) in 1936. Subsequent versions, now edited by a committee, have remained the more popular of the two revisions still in common use.

**diatonic:** describes scales composed of two intervals, the tone and the semitone (half the acoustic distance of the former)

**diazeuxis:** as defined by Boethius (5<sup>th</sup>-6<sup>th</sup> cc. AD), disjunct fourths, separated by a whole tone, e.g. *do-fa-sol-do'*

**diminished fifth:** one half step below a perfect fifth, e.g. *ti-fa'*; enharmonic with an augmented fourth

**dispersed harmony:** characteristic of *The Sacred Harp*, esp. earlier editions, and of other hymnals of the same genre; identified by Dorothy Horn (1970) as quartal harmony, may also refer to polyphonic character of the earlier arrangements

**dominant:** the fifth degree of a scale above the tonic, also a fourth below the tonic (see **inversion**)

**Dorian mode:** tonic is *re*, with semitones between the 2<sup>nd</sup>-3<sup>rd</sup> and 6<sup>th</sup>-7<sup>th</sup> degrees

**dyad:** a harmonic chord composed of two notes,, e.g. *do-fa* or *do-sol*, characteristic of quartal rather than tertian harmony

**Elizabeth I** (1533-1603) Queen of England during the initial stage of English colonization of North America

**enharmonic:** a note or interval equivalent to an adjoining note or interval, but named differently, e.g. E# = F

**equal temperament:** the now generally accepted tuning system which places an equal acoustic distance between each semitone of the chromatic scale, and so equalizes the distances between tones and semitones, respectively, of the diatonic scale

**fasola**: an older solmization employed in Elizabethan times in England and in Colonial America, and which survives in *The Sacred Harp* (Denson book, 1991)

**fixed pitch**: sound (higher or lower) of a note identified with a specific frequency in cycles per second, or *Hertz* (Hz)

**flat**: a note or interval reduced by one half step; as applied in the present study to the semitones *mi* and *ti*, one half step above the preceding note in a scale, and a whole step before the following note in the scale

**gamut**: (*older usage*) the full range of pitches in a musical system (scale or melody)

**gapped scale**: a diatonic scale omitting one or both of the semitones

**Glarean, Heinrich**: expanded (1547) the Guidonian system (see following) to admit all degrees of the scale as the tonic of a mode

**Guido of Arezzo**: aka Guido d'Arezzo; developed (1025) a system of modal classification for Gregorian Chant, using the notes *re*, *mi*, *fa* and *sol* as tonics; traditional music theory is ultimately founded on his work

**half step**: aka semitone, the lesser of the two intervals used in the diatonic scale

**harmonic series**: resonant frequencies (overtones) which accompany the production of a musical sound

**heptatonic**: the complete diatonic scale, comprised of seven notes

**hexachord**: a scale composed of six successive notes in a diatonic scale

**hexatonic**: a diatonic scale omitting one semitone

**incipit**: the opening phrase of a melody

**interval**: the acoustic distance between two notes; also the note separated by that distance from the previous note

**intonation**: (see **temperament**); also, the opening phrase of a melody (see **incipit**)

**inversion**: displacement of the lower of two intervals to the octave above the other interval, e.g. the inversion of *fa-la* is *la-fa'*

**Ionian mode**: tonic is *do*; the common practice “major” scale, with semitones between the 3<sup>rd</sup>- 4<sup>th</sup> and 7<sup>th</sup>-8<sup>th</sup> degrees

**just intonation**: a modification of Pythagorean tuning to arrive at the true octave

**Locrian mode**: tonic is *ti*, with semitones between the 1<sup>st</sup>-2<sup>nd</sup> and 4<sup>th</sup>-5<sup>th</sup> degrees

**Lydian mode**: tonic is *fa*, with semitones between the 4<sup>th</sup>-5<sup>th</sup> and 7<sup>th</sup>-8<sup>th</sup> degrees

**major scale**: in common practice, the Ionian mode (see above); in modal terms, those scales with a major third above the tonic

**major second, third, sixth or seventh**: these intervals correspond to the respective degrees of the Ionian mode

**meter**: the rhythmic structure of a hymn, generally consisting of a fixed pattern of accents in each verse of a stanza

**minor second, third, sixth or seventh**: these intervals are each one half step lower than their major counterparts, and so correspond to the respective degrees of the Phrygian mode

**mixed range**: as defined by Bronson, extends from a fourth (the dominant) below to the octave above the tonic

**Mixolydian mode**: tonic is *sol*, with semitones between the 3<sup>rd</sup>-4<sup>th</sup> and 6<sup>th</sup>-7<sup>th</sup> degrees

**mode**: a musical scale; in particular, a diatonic scale characterized by the specific positions of the semitones

**natural**: the unaltered pitch of a note; as applied in the present study to the semitones *mi* and *ti*, one whole step above the preceding note in a scale, and a half step before the following note in the scale

**neutral third, sixth**: either (often, not always, a semitone) is half the distance ( i.e. 3/4 step) between the minor and major interval of the same degree

**note**: a particular degree of a scale; in musical notation, a sign representing the pitch and duration of a musical sound

**octave**: the eighth note above another note in a diatonic scale; determined by the Pythagorean ratio 2:1

**oral tradition**: cultural material passed on from one generation to the next orally, rather than by writing

**overtone**: a frequency higher than the fundamental frequency of a sound, and which accompanies it

**pentachord**: a scale composed of five successive notes in a diatonic scale

**pentatone**: one of the five notes of a pentatonic scale, i.e. *fa, sol, la, do or re*.

**pentatonic**: a diatonic scale omitting both semitones

**perfect fourth or fifth**: 2½ or 3½ steps, respectively, above a previous note, esp. the tonic; determined by the Pythagorean ratios 4:3 and 3:2, respectively

**Phrygian mode**: tonic is *mi*, with semitones between the 1<sup>st</sup> -2<sup>nd</sup> and 5<sup>th</sup>-6<sup>th</sup> degrees

**plagal range**: defined by Guido (see above) as extending a fifth above and a fourth below the tonic, i.e. from the dominant below to the dominant above the tonic

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**Pythagorean comma**: the small interval (approx. one quarter of a semitone) which occurs in

**Pythagorean tuning** (see following) between two enharmonically equivalent notes, e.g. F and E#

**Pythagorean tuning**: a system of musical tuning in which the frequency ratios of all intervals are derived from the ratio 3:2, that of a perfect fifth, e.g. *do-sol*; named for the Greek philosopher Pythagoras of Samos (6<sup>th</sup> century BC)

**quartal harmony**: based on the interval of the fourth

**quatrain**: the most frequent stanzaic form used in hymns, consisting of four verses

**raised sixth**: the sixth degree of an Aeolian melody raised a semitone, thus making the mode Dorian

**range**: the distance from the lowest to the highest note in a melody

**relative pitch**: degrees of the scale identified by their relative distance from other degrees of the scale, rather than having fixed pitches

**scale**: the set of notes used in a melody or set of melodies

**semitone**: a half step, the smaller of the two intervals used in the diatonic scale

**shape notes**: a system of musical notation devised (1801, in the United States) to identify degrees of the scale by using different shapes for the note heads (see following)

**sharp**: a note or interval raised by one half step

**sol-fa** (Fr. *solfège*, It. *solfeggio*): method of sight-singing which uses the names of the notes assigned by a system of solmization (see following, also **fasola**, above)

**solmization**: the names given to the successive degrees of a scale: for the diatonic scale, these are (since the Eleventh Century) *do* (aka *ut*), *re*, *mi*, *fa*, *sol*, *la* and *ti* (aka *si*)

**stanza**: the textual division of a hymn, having a set number of verses with a specific rhyme scheme; successive stanzas or pairs of stanzas are usually sung to the same melody

**subdominant**: the fourth degree above the tonic of a scale, also a fifth below the tonic (see inversion)

**synaphe**: as defined by Boethius (5<sup>th</sup>-6<sup>th</sup> cc. AD), conjunct fourths, superposed on a common tone, e.g. *re-sol-do'*

**temperament**: system of tuning, ie. the exact pitches used for successive degrees of a scale

**tertian harmony**: based on the interval of the third

**tetrachord**: four successive notes in a diatonic scale

**tonality**: the key structure of a melody (see **tonic**)

**tone**: a whole step, the larger of the two intervals used in the diatonic scale

**tonic**: the first note of a diatonic scale, and which identifies its mode or key

**triad**: a harmonic chord composed of two conjunct thirds, either major or minor, e.g. *fa-la-do*, or *re-fa-la*

**tritone**: an interval comprising three whole tones; see **augmented fourth** or **diminished fifth**

**verse**: a single poetic line within a hymn, usually having a fixed number of syllables and pattern of accents; sometimes (and incorrectly) used to mean stanza

**whole step**: a tone; the larger of the two intervals used in the diatonic scale

\* \* \*

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# THE ACOUSTIC BASIS OF THE DIATONIC SCALE

to which is appended

## THE PYTHAGOREAN RATIOS OF THE DIATONIC SCALE

by David G. Jensen

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The principle is simple; its application is complex, but not complicated..

A1. Music, originally and primarily vocal music, is among the defining activities of human behavior and experience. Its formative social role was expounded by the ancient Greek philosopher Plato (*ca* 427 – 347 BCE), whose concepts continue to permeate Western thought. It may be affirmed in this regard that singing is not merely an art, acquired and perfected under professional guidance, but a behavior, a social behavior, properly as integral in the conduct of human life as language. Like language, its practice consists not of a series of arbitrary conventions, but is governed by the capacities of the place (mouth) and manner (voice) of its production, and, in the case of singing, the nature of its medium (sound). The latter is the subject of the present essay.

NB: The chronology in the following is not intended to be comprehensive,  
but any account of the subject requires reference to particular persons and events.

A02. Historically, music by definition consists of various series and combinations of sounds, which are differentiated by *pitch* (vibrations per second) and *interval* (the relative difference between pitches, both horizontal (melody) and vertical (harmony)). These sounds are generally drawn from sets of *notes* (sounds differentiated by interval). Such a set is a *scale*. The sequence of notes which comprise a scale, *degrees*, are numbered (second, third *etc*) from the tonic to the octave (§A06). A scale distinguished by particular intervals between its member notes is a *mode*. Pitch occurs in a theoretical continuum, although its selection is by no means random (§A20). On the other hand, the selection of intervals, despite occasional assertions to the contrary, is very much guided by nature.

A03. The science of these and the remaining properties of sound is *acoustics*.

A specific musical sound has the following attributes:

*amplitude* is loudness;

*wavelength* is the spatial distance between successive oscillations of pitch

(propagated in air, and visually represented in diagrams), the speed of which constitutes

*frequency*; the higher the frequency, the shorter the wavelength. An acoustic

*period* is the time which elapses between the successive sound waves; the higher the pitch, the shorter the period.

A04. Rather than these characteristics of individual notes, however, the present essay concerns the tuning of notes in relation to each other, and the various *modes* which can be created by altering their sequence. It regards the precise fixing of tonal distances *between* the notes in the melody, rather than *harmony*, the simultaneous recital of parallel sequence(s) of notes above and/or below the melody.

A05. On the other hand, the acoustic science of *temperament*, the fixing of precise intervals between the notes, is far less difficult and obscure than it sometimes is presented to be. The visual charts and diagrams, *etc* at times appear to require an advanced knowledge of mathematics. A practical understanding of the subject, however, needs no more than command of basic arithmetic, including fractions and decimals, and elementary algebra (several variables), as will be shown in the following paragraphs.



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A06. The issue became apparent in the Ancient World in the design and tuning of certain musical instruments. The Greek philosopher Pythagoras (*ca* 570 - *ca* 495 BCE), Plato's predecessor and known as well for his other mathematical discoveries, is credited with discovering the underlying principle of tonality, which is a numeric ratio. The legend is that he made this discovery listening to hammers of varying sizes and weights in a blacksmith's shop. He soon deduced that dividing the length of a string on an instrument in half will raise its note an *octave* (the eighth note following, perceived as the next highest occurrence of the key note of the scale). Further experimentation revealed that on a string pressed at two-thirds of its length, the lower, longer segment produces the fifth note (the *dominant*) above the *tonic* (key note). It was then easily deduced that the longer segment of a string pressed at three-fourths its length sounds the fourth degree (the *subdominant*) above the tonic. These proportions,

$$2 : 1 = \text{octave}, 3 : 2 = \text{fifth} \text{ and } 4 : 3 = \text{fourth}$$

are among the primary and best-known tonal concepts in music. The sum of the factors, 2, 3 and 4, equals 10, which led Pythagoras and his followers to hold that number in special esteem. By happy coincidence, 10 is also the *radix* (numerical base) of Western and most other mathematics, although this likely derived from 10 being the number of fingers, the original counting device.

A07. Western music is *diatonic*, meaning that the notes which comprise a scale consist of two intervals: *tones* (also whole-steps) and *semitones* (also half-steps). As its name suggests, a semitone consists of half (variable within a narrow range) the frequency ratio of a tone, which can be characterized as half its "distance." The diatonic scale consists of seven notes, five tones and two semitones, beginning on the tonic and concluding with the octave, on which resumes the same sequence of intervals within a higher range of pitch.

A08. The semitones occur between series of two and three consecutive tones, respectively. By custom, the lower of two notes separated by a half-step is labeled the semitone; when the semitone is flat (reduced by a half-step), of course, the half-step separates it from the preceding note. The position of the semitones within the numerical sequence of notes in a scale varies according to mode. In the familiar "major" (historically *Ionian*) mode, this sequence consists of:

A. tone tone semitone tone tone tone semitone octave

The semitones here occur between the third-fourth and the seventh-eighth degrees of the scale.

Contrast the above with the sequence of intervals in the equally familiar "minor" (*Aeolian*) mode:

B. tone semitone tone tone semitone tone tone octave

The semitones here are found between the second-third and fifth-sixth degrees of the scale.

A09. The absolute pitches accorded the successive notes of the diatonic scale are by successive capital letters of the alphabet. These letters correspond with the white keys of a keyboard. The half-step is found between B-C and E-F.

A. Major: C D E-F G A B-C'

B. Minor: A B-C D E-F G A'

A10. As mentioned, these letters represent absolute pitches, centered within the broader range comfortable to the human ear and voice. Claims to the contrary notwithstanding, the specific pitches of the scale are fixed by custom or negotiated convention. The pitches accorded the various notes of a scale are computed, using the Pythagorean ratios, from the frequency of the tonic. Given that the specific pitches are arbitrary, logic suggests another set of names for the notes which is not dependent on the frequencies assigned to those intervals.

A11. Such a set of names given the notes is its *solmisation*. In Western music, this is the familiar series *do, re, mi, fa, sol, la*, and *ti* (resuming on the next and higher *do*). This system was devised *ca* 1025 by a Benedictine monk, Guido of Arezzo (Italy). The names were derived from the initial syllables of a Latin hymn, although they were slightly modified later for practical purposes. The major scale begins on *do*, and the minor scale on *la*. From this, it can be easily deduced that the semitones are *mi* and *ti*, separated by a half-step from their following notes, *fa* and *do* respectively. The intervals in the *do-re-mi* scale are fairly stable. The use of accidentals (sharps and flats), modulation to another key, *etc*

were not really an issue until instrumental music became more complex in the later Middle Ages and the Renaissance. In vocal music, the only common accidentals were b-flat (lowered by a half-step) and, to a lesser degree, f-sharp (raised by a half-step). In fact, the flat sign (  $\flat$  ) was in origin a stylized ‘b.’

A12. Intonation (§A27) begins with the relative pitches assigned by the ear to the various intervals, both melody (horizontal) and harmony (vertical). Although variable within a narrow range, the pitches of the different notes can be derived from the Pythagorean ratios described in §A06. This does not require that the singer inwardly calculate these ratios before each note. The Pythagorean ratios simply describe how the orderly structure of pitch differences within a piece of music is generated, a process which the ear is adept at discerning. This order is part of beauty. A melody is attractive not so much because of the sounds themselves, but the pattern of differences between the set of frequencies it contains. The other dynamic and complementary component of the process is the *overtone*, (also “harmonic”) series (§A22).

A13. The Pythagorean ratios for the three “perfect” intervals, (four, actually, including the tonic), the most important notes of the scale, were cited in §A06. The next step is to compute the ratios for the remaining notes of the diatonic scale. To do so comfortably requires the additional concept of *inversion*. An inversion of any interval is the same number of (half-)steps above the tonic counted down from the octave, which itself is the inversion of the tonic. Simply reversing the ratio of an interval provides its inversion, albeit in the preceding octave. Thus, the inversion of *sol* (3 : 2) is 2 : 3, which produces *FA* (upper case in this context indicates the octave below the tonic). Multiply by 2 (see §A14, following) to obtain *fa* (see P06), which is the inversion of *sol*.

A14. Likewise, if 2 : 1 indicates that the frequency of octave is twice that of the tonic, so 1 : 2 lowers it by the same degree. In functional terms, this means to multiply the octave times 1/2 to obtain the frequency of the tonic; and to multiply the tonic times 2/1 to obtain that of the octave. Thus,  $2/3 \times 2/1$  does indeed obtain the Pythagorean ratio 4/3 for the perfect fourth. The intervals of fourth, fifth and octave are “perfect” because they alone (with a single, glaring exception, the augmented fourth in the Locrian mode, P06) are stable throughout the various modes, which turn out to be mere permutations of the diatonic scale (§A11).

A15. The calculation of Pythagorean intervals can be performed among the ratios alone, without reference to a specific frequency. These calculations require only the four arithmetic operations applied to fractions. The primary operations are multiplication (for an interval above) and division (for an interval below). For example the addition of a fourth above the fifth can be obtained as follows:

A. A fifth,  $3/2 \times$  a fourth,  $4/3 = 3 \times 4/2 \times 3 = 12/6$ , or 2/1, or the Pythagorean ratio of the octave (§A06)

The inversion of this equation, a fifth below the octave, is obtained in this manner:

B. Using cross-multiplication, an octave,  $2/1 \div$  a fifth,  $3/2 = 2 \times 2 / 1 \times 3$ , or 4/3, the Pythagorean fourth.

A16. By using various combinations of these operations, it is possible to compute the Pythagorean ratios for all the degrees of the diatonic scale:

A. Major scale: *do* 3e0 : 2e0 *re* 3e2 : 2e3 *mi* 3e4 : 2e6 *fa* 2e2 : 3e1 *sol* 3e1 : 2e1 *la* 3e3 : 2e4 *ti* 3e5 : 2e7

B. Minor scale: *la* 3e0 : 2e0 *ti* 3e2 : 2e3 *do* 2e5 : 3e3 *re* 2e2 : 3e1 *mi* 3e1 : 2e1 *fa* 2e7 : 3e4 *sol* 2e4 : 3e2

A17. The only terms employed in Pythagorean ratios are exponentials of the integers 3 and 2 (3e0 and 2e0 both = 1), 3 usually the antecedent and 2 the consequent (3Ex : 2Ey), with some (§A17) apparent inversions, e.g. 2e2 : 3e1 in the Ionian mode. The reason for this is simple. Every degree of the chromatic (§A24) scale is distinguished by successive exponents of 3 (3e1 through 3e12) according to its position in the cycle of fifths. (P11). The term 2 in the ratio serves to locate the interval in the octave (in, above or below either the tonic or its octave (§A06).

A18. Despite certain current attempts to identify key with frequency, their correspondence is not absolute, and has varied historically and geographically. The current standard A4=440Hz is historically recent, and was not accepted internationally until 1955. This puts C4 (Middle C) at 261.656 Hz. The older standard, however, has some basis in nature, predicated on Pythagoras’ (§A06) teaching that all bodies (physical entities) emit vibrations analogous to musical frequencies, a phenomenon traditionally characterized as the “music of the spheres.”

A19. Modern science has affirmed that this assertion is true. It was predicted by the physicist Winfried Otto Schumann during 1952-4, and accurately measured a decade later, that the planet Earth emits a frequency of *ca* 8 Hz (7.83 Hz to be exact, although it varies slightly). Raising this frequency by five octaves ( $2e3 \times 2e5 = 2e8$ ) puts C4 at 256 Hz and A4 at 432 Hz, which in fact agrees with prior usage (§A02), proposed as a universal standard as early as 1713, and evidence for which also remains in the structure of ancient instruments constructed *lit* millennia before (§A27). A4=432Hz has modern adherents for metaphysical as well as historical reasons, but is employed here (§A20) solely to reflect traditional use. Some find the lower frequencies preferable.aesthetically.

A20. A set of Tables under the title *Pythagorean Ratios of the Diatonic Scale* is appended to this essay (pp. 6-10), and includes the frequencies for each interval reckoned according to A4=432 (§A19).

021. Thus far, the system of Pythagorean ratios and their corresponding frequencies would appear to be compact and symmetrical, and diatonic tonality a closed system and consonant, *i e* free of unintended discord. Unfortunately, this is not the case, – or perhaps fortunately, for if it were, music would be less interesting, and far less capable of beauty. The culprit is the overtone series (also *harmonics*, or *partials*, §A12).

A22. The overtones are a set of less conspicuous frequencies which accompany the articulation (production) of any musical tone. The harmonic (overtone) series is generated simply by multiplying  $f$  (the *fundamental*, or *tonic*)  $\times 1, 2, 3, \dots$ .  $f \times 1$  is the first harmonic,  $\times 2$  the second harmonic, and so on. The harmonic series becomes progressively fainter and less audible in its successive multiples.

A23. It is sometimes claimed that diatonic tonality is the product of the harmonic series. This is partly true, in a sense complementary with the Pythagorean ratios, which govern the precise intervals. The problem is that the Pythagorean series is *exponential*, whereas the harmonic series is *arithmétic*, *i e* the Pythagorean frequencies are derived from various ratios of 3 and 2 (3Ex : 2Ey, and *vv.*),whereas the harmonic series, as mentioned, is composed of successive multiples of  $f$  ( $\times 1, 2, 3, \text{ etc}$ ). Thus, their products do not correspond directly, but coincide only on increasingly distant, although predictable, occasions (P13). Historically, this became evident in the following manner:

A24. The primary harmonic interval (third in the harmonic series) is the fifth (Pythagorean 3 : 2). Multiplying this ratio by itself produces a series of twelve notes, each a semitone, which comprise the *chromatic scale*, culminating on the octave:

F C G D A E B F# C# G# D# A# E# (= F) [B# (= C')]

This series, call the *Circle, or Cycle, of Fifths*, extends seven octaves, and so  $2e7$  must be factored into  $2e12 : 3e12$  to reduce the range to the equivalent interval. Thus,  $2e19 : 3e12 = 524,288 : 531,441$

$$531,441 / 524,288 = 1.0136432 ; - 1.0000000 = .0136432 \text{ (Pythagorean comma)}$$

The *Cycle of Fourths* is the inversion of the Cycle of Fifths:

B E A D G C F B<sub>b</sub> E<sub>b</sub> A<sub>b</sub> D# G<sub>b</sub> C<sub>b</sub> (= B) [F<sub>b</sub> (= E')]

NB: As in §A09, the apostrophe (') in this context denotes the octave above the tonic.

A25. Thus, the octave concluding the Cycle of Fifths is not exact, but is very slightly sharp. The difference is known as the *Pythagorean comma*. Such minor differences recur through the calculation of Pythagorean intervals , and are often also called different sorts of comma, these and more specific names having been assigned by Ancient Greek theorists. The reason is obvious: no power of 3, an odd integer, can equal any power of 2, an even integer. Historically, the problem is universal; it becomes evident in the design and tuning of musical instruments (§A06), in particular those requiring fixed. distances, such as the finger holes on winds, and the frets on stringed instruments (A contiguous issue, of course, is the frequency range of which an instrument is capable.) Cultural traditions have arrived at various solutions; all require some alteration, addition or omission of intervals in order to make the octave

come out even and to obviate other incongruous dissonances. In the West, this question became acute in the design of keyboard instruments, first the organ in the Middle Ages, and especially during the Renaissance, with the development of those in which the strings are plucked (harpsichord) or struck (clavichord, and, later, piano), *etc*).

A26. The tuning problem became more difficult to avoid because the newer keyboards allowed more frequent accidentals (additional sharped and flatted notes), modulation, transposition and a broader range of keys (tonics) in general. This generated a period of unprecedented experimentation and development, in combination (*ensemble*) with other instruments as well. As the Pythagorean dissonances became more evident, systems of subtle alteration of pitches evolved in addition to those employed during the Middle Ages. As the present essay concerns vocal acoustics, this subject will not be discussed further, except to observe one compelling development (§A28) which remains an obstacle in the experience of older music, whether vocal or instrumental.

A27. The inherent acoustic asymmetry revealed by the Pythagorean ratios would have been evident, if not understood, in the earliest stages of human musical culture. Artifacts excavated (§A20) in various regions include Neolithic-Era bone flutes, which require fixed intervals, over 40,000 years old. The issue was inescapable in the subsequent design of musical instruments. As also mentioned in §A25, different traditions adopted various solutions. The problem was most apparent in the definition and tuning of the semitones (*mi* and *ti*). At one extreme, China and neighboring cultures omitted them altogether. At the other extreme, music in India, of similar antiquity, admitted and formalized microtones (intervals of less than a semitone). Every possible alternative, including the *shading* (nuanced variation in pitch according to context) of notes, is or has been employed at some place at some time. The tonality of Western Europe, as has been noted, is rooted in the mathematical speculations of Ancient Greece (§§A01 & A06). The modification of ratios and frequencies to enable a true octave (§025) is *temperament*, although the term *intonation* is sometimes used in an analogous sense (§A12). Various resolutions of the Pythagorean dilemma have been attempted during the musical history of the West. Adjustments to this system were proposed as early as Aristoxenus (4<sup>th</sup> Century BCE) and Claudius Ptolemy (2<sup>nd</sup> Century CE). Much later (1722 & 1742), J. S. Bach's *Well-Tempered Clavier* promoted another example.

A28. A detailed history of temperament is beyond the scope of the present essay. Modern practice has accepted *equal temperament* since the late Nineteenth Century, although this system had earlier advocates. Equal temperament resolves the problem by ignoring it, and reduces the diatonic scale to twelve equal semitones, each separated by 1.05946 Hz (= the 12th root of 2). This system has obvious advantages in the design of musical instruments, especially when mass production became possible with industrialization, and it facilitated the experiments in composition which ensued during the Twentieth Century, *i.e.* it radically changed Western tonality..

A29. Obviously, however, the intervals within the octave are subtly out of tune. It also distorts the enharmonic (§A23 & P13) effects of the overtone series. Moreover, it regards the degrees of the scale as functions of the octave, rather than *vice-versa* (§§17 & 25). It is maintained that the advantages of the system far outweigh its deficits, and "accurate" intervals are defined as a narrow range of pitch which the ear is conditioned to perceive as equivalent. Indeed, the system and its various applications have been elevated to the virtual status of natural law. It does, however, require a preconscious re-tuning of auditory data to construct the natural tonal structure of what is heard, and the ear must be rigorously conditioned to hear equal-tempered intervals as "correct." Broadcast media are very effective at this. Even so, unaccompanied singer(s), by careful listening, may well recover, as some are, a very different experience, and one which is shared with their audience (§A01).

# THE PYTHAGOREAN RATIOS OF THE DIATONIC SCALE

by David G. Jensen

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P01. The diatonic scale consists of seven notes: five tones (whole-steps) and two semitones (half-steps), which occur between two and three tones, respectively. In the major scale, the semitones are found between the third-fourth and seventh-eighth degrees, and in the minor scale, between the second-third and fifth-sixth.

P02. The *key signature* indicates those notes which must be raised (*sharps* #) or lowered (*flats* b) to form a major or minor scale on each successive note (as tonic) of the diatonic scale. The same key signature forms the minor (called *relative*) scale on the sixth degree of the major scale.

P03. TABLE I, below, shows the key signatures for the major and minor scales on each successive note (degree, not pitch) of the diatonic scale. The use of letters in the left-hand column differs slightly from those indicating the series of pitches in those keys. In the former context, capital letters indicate major keys, and lower-case represent minor keys.

F	Major	F	G	A	B <sub>b</sub>	C	D	E	F'
d	relative minor	D	E	F	G	A	B <sub>b</sub>	C	D'
C	Major	C	D	E	F	G	A	B	C
a	relative minor	A	B	C	D	E	F	G	A'
G	Major	G	A	B	C	D	E	F#	G'
e	relative minor	E	F#	G	A	B	C	D	E'
D	Major	D	E	F#	G	A	B	C#	D'
b	relative minor	B	C#	D	E	F#	G	A	B'
A	Major	A	B	C#	D	E	F#	G#	A'
f#	relative minor	F#	G#	A	B	C#	D	E	F#'
E	Major	E	F#	G#	A	B	C#	D#	E'
c#	relative minor	C#	D#	E	F#	G#	A	B	C#'
B	Major	B	C#	D#	E	F#	G#	A#	B'
g#	relative minor	G#	A#	B	C#	D#	E	F#	G#

P04. Other names, free of context, exist for degrees of the scale besides *do re mi*.

The following are commonly used for the notes of the diatonic scale:

1. tonic	3. mediant	5. dominan	7. leading tone
2. supertonic	4. subdominan	6. submediant	8. octave

The term *chromatic scale* refers to the twelve consecutive semitones contained within an octave:

1. first (tonic)      2. minor second      3. major second      4. minor third      5. major third      6. perfect fourth  
7. augmented fourth\*      8. perfect fifth      9. minor sixth      10. major sixth      11. minor seventh      12. major seventh

\*The fourth is augmented in the Lydian mode (TABLE II), and the fifth is diminished in the Locrian. The two intervals are *enharmonic* (A4 = d5); see TABLE III. The interval is also called a *tritone*, as it consists of three consecutive tones (whole steps).

P05. *Perfect* (abbrev. P) describes those intervals [first, fourth, fifth and octave] which, with two exceptions, remain stable throughout the various modes; *minor* (m) denotes the lower of the two semitones which comprise a whole tone, and *major* (M) the higher of these semitones. *Augmentation* (A) is the raising of any interval by a semitone (e.g. A6 = m7) and *dimunition* (d, adj. *diminished*) the lowering by a semitone (e.g. d4 = M3). In the case of a whole tone which can be either major or minor, dimunition lowers it by a whole step, e.g. d6 = P5).

<https://davidgjensen.academia.edu/>

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## PYTHAGOREAN RATIOS OF THE PYTHAGOREAN SCALE, cont.

P06. TABLE II. Below and on the following page are tabulated the Pythagorean ratios for the successive permutations of the diatonic scale. They extend here for three octaves, of Middle C (C4), the octave below (C3) and the octave above (C5). They comprise both the Authentic (tonic to octave) and Plagal, or "Hypo-" (5<sup>th</sup> below tonic to 5<sup>th</sup> above) modes (fourteen in all) on each degree of the scale. The notes constituting each scale are shown **bold type** in its column. The ratios in these charts employ scientific e-notation for exponents, e.g. 2e3 = 2 raised to the 3<sup>rd</sup> power; capital E is used when the exponent is a lower-case alphabetic variable, e.g. 2En. The upper-case letters (A, B, C etc.), however listed in their *note* column here indicate relative rather than absolute pitches, as do the degrees.

degree	note	Ionian	Hypo-Ionian	Dorian	Hypo-Dorian	Phrygian	Hypo-Phrygian	Lydian	Hypo-Lydian
<i>DO</i>	C3	3e0 : 2e1	3e0 : 2e1	2e2 : 3e2	2e2 : 3e2	2e5 : 3e4	2e5 : 3e4	3e1 : 2e3	3e1 : 2e3
<i>RE</i>	D3	3e2 : 2e4	3e2 : 2e4	3e0 : 2e1	3e0 : 2e1	2e2 : 3e2	2e2 : 3e2	3e3 : 2e6	3e3 : 2e6
<i>MI</i>	E3	3e4 : 2e7	3e4 : 2e7	3e2 : 2e4	3e2 : 2e4	3e0 : 2e1	3e0 : 2e1	3e5 : 2e9	3e5 : 2e9
<i>FA</i>	F3	2e1 : 3e1	2e1 : 3e1	2e4 : 3e3	2e4 : 3e3	2e7 : 3e5	2e7 : 3e5	3e0 : 2e1	3e0 : 2e1
<i>SOL</i>	G3	3e1 : 2e2	<b>3e1 : 2e2</b>	2e1 : 3e1	2e1 : 3e1	2e4 : 3e3	2e4 : 3e3	3e2 : 2e4	3e2 : 2e4
<i>LA</i>	A3	3e3 : 2e5	<b>3e3 : 2e5</b>	3e1 : 2e2	<b>3e1 : 2e2</b>	2e1 : 3e1	2e1 : 3e1	3e4 : 2e7	3e4 : 2e7
<i>TI</i>	B3	3e5 : 2e8	<b>3e5 : 2e8</b>	3e3 : 2e5	<b>3e3 : 2e5</b>	3e1 : 2e2	<b>3e1 : 2e2</b>	3e6 : 2e10	3e6 : 2e10
<i>do</i>	C4	<b>3e0 : 2e0</b>	<b>3e0 : 2e0</b>	2e3 : 3e2	<b>2e3 : 3e2</b>	2e6 : 3e4	<b>2e6 : 3e4</b>	3e1 : 2e2	<b>3e1 : 2e2</b>
<i>re</i>	D4	<b>3e2 : 2e3</b>	<b>3e2 : 2e3</b>	<b>3e0 : 2e0</b>	<b>3e0 : 2e0</b>	2e3 : 3e2	<b>2e3 : 3e2</b>	3e3 : 2e5	<b>3e3 : 2e5</b>
<i>mi</i>	E4	<b>3e4 : 2e6</b>	<b>3e4 : 2e6</b>	3e2 : 2e3	<b>3e2 : 2e3</b>	<b>3e0 : 2e0</b>	<b>3e0 : 2e0</b>	3e5 : 2e8	<b>3e5 : 2e8</b>
<i>fa</i>	F4	<b>2e2 : 3e1</b>	<b>2e2 : 3e1</b>	2e5 : 3e3	<b>2e5 : 3e3</b>	2e8 : 3e5	<b>2e8 : 3e5</b>	<b>3e0 : 2e0</b>	<b>3e0 : 2e0</b>
<i>sol</i>	G4	<b>3e1 : 2e1</b>	<b>3e1 : 2e1</b>	2e2 : 3e1	<b>2e2 : 3e1</b>	<b>2e5 : 3e3</b>	<b>2e5 : 3e3</b>	3e2 : 2e3	<b>3e2 : 2e3</b>
<i>la</i>	A4	<b>3e3 : 2e4</b>	3e3 : 2e4	<b>3e1 : 2e1</b>	<b>3e1 : 2e1</b>	2e2 : 3e1	<b>2e2 : 3e1</b>	<b>3e4 : 2e6</b>	<b>3e4 : 2e6</b>
<i>ti</i>	B4	<b>3e5 : 2e7</b>	3e5 : 2e7	<b>3e3 : 2e4</b>	3e3 : 2e4	<b>3e1 : 2e1</b>	<b>3e1 : 2e1</b>	<b>3e6 : 2e9</b>	<b>3e6 : 2e9</b>
<i>do'</i>	C5	<b>2e1 : 3e0</b>	2e1 : 3e0	<b>2e4 : 3e2</b>	2e4 : 3e2	<b>2e7 : 3e4</b>	2e7 : 3e4	<b>3e1 : 2e1</b>	<b>3e1 : 2e1</b>
<i>re'</i>	D5	3e2 : 2e2	3e2 : 2e2	<b>2e1 : 3e0</b>	2e1 : 3e0	<b>2e4 : 3e2</b>	2e4 : 3e2	<b>3e3 : 2e4</b>	3e3 : 2e4
<i>mi'</i>	E5	3e4 : 2e5	3e4 : 2e5	3e2 : 2e2	3e2 : 2e2	<b>2e1 : 3e0</b>	2e1 : 3e0	<b>3e5 : 2e7</b>	3e5 : 2e7
<i>fa'</i>	F5	2e3 : 3e1	2e3 : 3e1	2e6 : 3e3	2e6 : 3e3	2e9 : 3e5	2e9 : 3e5	<b>2e1 : 3e0</b>	2e1 : 3e0
<i>sol'</i>	G5	3e1 : 2e0	3e1 : 2e0	2e3 : 3e1	2e3 : 3e1	2e6 : 3e3	2e6 : 3e3	3e2 : 2e2	3e2 : 2e2
<i>la'</i>	A5	3e3 : 2e3	3e3 : 2e3	3e1 : 2e0	3e1 : 2e0	2e3 : 3e1	2e3 : 3e1	<b>3e4 : 2e5</b>	<b>3e4 : 2e5</b>
<i>ti'</i>	B5	3e5 : 2e6	3e5 : 2e6	3e3 : 2e3	3e3 : 2e3	3e1 : 2e0	3e1 : 2e0	3e6 : 2e8	3e6 : 2e8
<i>do''</i>	C6	2e2 : 3e0	2e2 : 3e0	2e5 : 3e2	2e5 : 3e2	2e8 : 3e4	2e8 : 3e4	3e1 : 2e0	3e1 : 2e0

degree	note	Mixolydian	Hypo-Mixolydian	Aeolian	Hypo-Aeolian	Locrian	Hypo-Locrian
<i>DO</i>	C3	3e1 : 2e0	3e1 : 2e0	2e3 : 3e3	2e3 : 3e3	2e6 : 3e5	2e6 : 3e5
<i>RE</i>	D3	3e1 : 2e3	3e1 : 2e3	3e1 : 2e0	3e1 : 2e0	2e3 : 3e3	2e3 : 3e3
<i>MI</i>	E3	3e3 : 2e6	3e3 : 2e6	3e1 : 2e3	3e1 : 2e3	3e1 : 2e0	3e1 : 2e0
<i>FA</i>	F3	2e2 : 3e2	2e2 : 3e2	2e5 : 3e4	2e5 : 3e4	2e8 : 3e6	2e8 : 3e6
<i>SOL</i>	G3	2e1 : 3e0	2e1 : 3e0	2e2 : 3e2	2e2 : 3e2	2e5 : 3e4	2e5 : 3e4
<i>LA</i>	A3	3e2 : 2e4	3e2 : 2e4	2e1 : 3e0	2e1 : 3e0	2e2 : 3e2	2e2 : 3e2
<i>TI</i>	B3	3e4 : 2e7	3e4 : 2e7	3e2 : 2e4	3e2 : 2e4	2e1 : 3e0	2e1 : 3e0
<i>do</i>	C4	2e1 : 3e1	2e1 : 3e1	2e4 : 3e3	2e4 : 3e3	2e7 : 3e5	2e7 : 3e5
<i>re</i>	D4	3e1 : 2e2	<b>3e1 : 2e2</b>	2e1 : 3e1	2e1 : 3e1	2e4 : 3e3	2e4 : 3e3
<i>mi</i>	E4	3e3 : 2e5	<b>3e3 : 2e5</b>	3e1 : 2e2	<b>3e1 : 2e2</b>	2e1 : 3e1	2e1 : 3e1
<i>fa</i>	F4	2e3 : 3e2	<b>2e3 : 3e2</b>	2e6 : 3e4	<b>2e6 : 3e4</b>	2e9 : 3e6	<b>2e9 : 3e6</b>
<i>sol</i>	G4	<b>3e0 : 2e0</b>	<b>3e0 : 2e0</b>	2e3 : 3e2	<b>2e3 : 3e2</b>	2e6 : 3e4	<b>2e6 : 3e4</b>
<i>la</i>	A4	<b>3e2 : 2e3</b>	<b>3e2 : 2e3</b>	<b>3e0 : 2e0</b>	<b>3e0 : 2e0</b>	2e3 : 3e2	<b>2e3 : 3e2</b>
<i>ti</i>	B4	<b>3e4 : 2e6</b>	3e4 : 2e6	3e2 : 2e3	3e2 : 2e3	<b>3e0 : 2e0</b>	<b>3e0 : 2e0</b>
<i>do'</i>	C5	<b>2e2 : 3e1</b>	2e2 : 3e1	<b>2e5 : 3e3</b>	<b>2e5 : 3e3</b>	<b>2e8 : 3e5</b>	<b>2e8 : 3e5</b>
<i>re'</i>	D5	<b>3e1 : 2e1</b>	<b>3e1 : 2e1</b>	<b>2e2 : 3e1</b>	<b>2e2 : 3e1</b>	<b>2e5 : 3e3</b>	<b>2e5 : 3e3</b>
<i>mi'</i>	E5	<b>3e3 : 2e4</b>	3e3 : 2e4	<b>3e1 : 2e1</b>	<b>3e1 : 2e1</b>	<b>2e2 : 3e1</b>	<b>2e2 : 3e1</b>
<i>fa'</i>	F5	<b>2e4 : 3e2</b>	2e4 : 3e2	<b>2e7 : 3e4</b>	2e7 : 3e4	<b>2e10 : 3e6</b>	<b>2e10 : 3e6</b>
<i>sol'</i>	G5	<b>2e1 : 3e0</b>	2e1 : 3e0	<b>2e4 : 3e2</b>	2e4 : 3e2	<b>2e7 : 3e4</b>	2e7 : 3e4
<i>la'</i>	A5	3e2 : 2e2	3e2 : 2e2	<b>2e1 : 3e0</b>	2e1 : 3e0	<b>2e4 : 3e2</b>	2e4 : 3e2
<i>ti'</i>	B5	3e4 : 2e5	3e4 : 2e5	3e2 : 2e2	3e2 : 2e2	<b>2e1 : 3e0</b>	2e1 : 3e0
<i>do''</i>	C6	2e3 : 3e1	2e3 : 3e1	2e6 : 3e3	2e6 : 3e3	2e9 : 3e5	2e9 : 3e5

## PYTHAGOREAN RATIOS OF THE PYTHAGOREAN SCALE, cont.

P07. The degrees of the diatonic scale are derived from the cycle of fifths (§A24). Despite appearances, their culmination is not equal to the octave (§A25). Each successive fifth in the cycle is increasingly (albeit incrementally) sharp, just as each successive member of the cycle fourths (the inversion of the cycle of fifths) is increasingly flat. The sharp (#) of each pentatone (C, D, F, G, A) is theoretically *enharmonic* (equivalent in pitch to) with the flat (b) of the note which follows. For the reason stated, this is not the case.

P08. TABLE III, below, in the center column shows the Pythagorean ratio for each degree of the chromatic scale computed from the three perfect ratios cited in (§A08). The column to the right shows these same intervals computed from the cycle of fifths; *chromatic* in this context refers exclusively to the semitones reckoned in this manner. Some are the same as the Pythagorean ratios. The column to the left represents the enharmonic intervals (called *diatonic* in this context) computed from the cycle of fourths. The remainder of the Pythagorean ratios are also found in this column. The diatonic series is the preferred method of reckoning semitones.

In the interval columns, P = perfect, m = minor, M = major, d = diminished, and A = augmented.

interval	diatonic	interval	Pythagorean	interval	chromatic
P1	2e0 : 3e0	P1	3e0 : 2e0	P1	3e0 : 2e0
m2	2e8 : 3e5	m2	2e8 : 3e5	A1	3e7 : 2e11
d3	2e16 : 3e10	M2	3e2 : 2e3	M2	3e2 : 2e3
m3	2e5 : 3e3	m3	2e5 : 3e3	A2	3e9 : 2e14
d4	2e13 : 3e8	m3	3e4 : 2e6	M3	3e4 : 2e6
P4	2e2 : 3e1	P4	2e2 : 3e1	A3	3e11 : 2e17
		A4	3e6 : 2e9	A4	3e6 : 2e9
d5	2e10 : 3e6	d5	2e10 : 3e6		
d6	2e18 : 3e11	P5	3e1 : 2e1	P5	3e1 : 2e1
m6	2e7 : 3e4	m6	2e7 : 3e4	A5	3e8 : 2e12
d7	2e15 : 3e9	M6	3e3 : 2e4	M6	3e3 : 2e4
m7	2e4 : 3e2	m7	2e4 : 3e2	A6	3e10 : 2e15
d8	2e12 : 3e7	M7	3e5 : 2e7	M7	3e5 : 2e7
d9	2e20 : 3e12	P8	2e1 : 3e0	A7	3e12 : 2e18

P09. TABLE IV, following, shows the entire set of ratios found in the present set of Tables, with their products represented as whole numbers, and their quotients of the fractions divided. The frequency of any note is determined by multiplying that of the *fundamental* (key note of the scale) by the quotient for that note; the term *rate*, in this context, is used rather than the term *quotient*.

ratios	products	rates	ratios	products	rates
3e0 : 2e0	1 / 1	1	2e0 : 3e0	1 / 1	1
3e1 : 2e1	3 / 2	1.5	2e1 : 3e0	2 / 1	2
3e2 : 2e3	9 / 8	1.12500	2e2 : 3e1	4 / 3	1.33333
3e3 : 2e4	27 / 16	1.68750	2e4 : 3e2	16 / 9	1.77778
3e4 : 2e6	81 / 64	1.26563	2e5 : 3e3	32 / 27	1.18519
3e5 : 2e7	243 / 128	1.89844	2e7 : 3e4	128 / 81	1.58025
3e6 : 2e9	729 / 512	1.42383	2e8 : 3e5	256 / 243	1.05350
3e7 : 2e11	2187 / 2048	1.06787	2e10 : 3e6	1024 / 729	1.40466
3e8 : 2e12	6561 / 4096	1.60181	2e12 : 3e7	4096 / 2187	1.87289
3e9 : 2e14	19,683 / 16,384	1.20135	2e13 : 3e8	8192 / 6561	1.24859
3e10 : 2e15	59049 / 32,768	1.80203	2e15 : 3e9	32,768 / 19683	1.66479
3e11 : 2e17	177,147 / 131,072	1.35152	2e16 : 3e10	65,536 / 59049	1.10986
3e12 : 2e18	531,441 / 262,144	2.02729	2e18 : 3e11	262,144 / 177,147	1.47981
			2e20 : 3e12	1,048,576 / 531,441	1.97308

## PYTHAGOREAN RATIOS OF THE PYTHAGOREAN SCALE, cont.

P10. TABLE V, below, shows the specific frequencies obtained from the ratios shown in TABLE IV, and which are computed from A4=432Hz by using the rates contained in that table. There are audible differences in the diatonic and chromatic frequencies for the ostensibly enharmonic intervals (*rf* §A25). Prior to the general acceptance of equal temperament (§A28), these differences conferred a distinctive character on the different keys, which well into the Baroque Era (17<sup>th</sup> - 18<sup>th</sup> Centuries) actually required adjustments in the tuning of keyboard instruments during public recitals.

diatonic		Pythagorean		chromatic	
key	Herz	key	Herz	key	Herz
C	256	C	256	C	256
D <sub>b</sub>	269.69547	D <sub>b</sub>	269.69547	C#	273.375
Ed	284.12363	D	288	D	288
E <sub>b</sub>	303.40741	E <sub>b</sub>	303.40741	D#	307.54688
F <sub>b</sub>	319.63908	E	324	E	324
F	341.33333	F	341.33333	E#	345.99023
		F#	364.5	F#	364.5
G <sub>b</sub>	359.59396	G <sub>b</sub>	359.59396		
Ad	378.83150	G	384	G	384
A <sub>b</sub>	404.54321	A <sub>b</sub>	404.54321	G#	410.06250
Bd	426.18544	A	432	A	432
B <sub>b</sub>	455.11111	B <sub>b</sub>	455.11111	A#	461.32031
C <sub>b</sub>	479.45862	B	486	B	486
Dd'	505.10867	C'	512	B#	518.98535

P11. TABLE VI. Simple multiplication of 3e1 : 2e1 reveals that the exponent of the term 3 increases by 1 in each successive ratio in the cycle of fifths. It is also clear the the antecedent (numerator) 3Ex in each major interval corresponds to the consequent (denominator) in the minor interval which is its inverion. 3Ex in each instance represents the same acoustic distance, in the major instance up from the tonic, and in the minor down from the octave, as is shown in the column on the right..

interval	ratio	interval	inversion	3Ex	relative distance
P1	3e0 : 2e0	P1	2e0 : 3e0	3e0	→ unison ←
P5	3e1 : 2e1	P4	2e2 : 3e1	3e1	→ fifth ←
M2	3e2 : 2e3	m7	2e4 : 3e2	3e2	→ whole tone ←
M6	3e3 : 2e4	m3	2e5 : 3e3	3e3	← minor third →
M3	3e4 : 2e6	m6	2e7 : 3e4	3e4	→ major third ←
M7	3e5 : 2e7	m2	2e8 : 3e5	3e5	← semitone →
A4	3e6 : 2e9	d5	2e10 : 3e6	3e6	→ tritone ←
A1	3e7 : 2e11	d8	2e12 : 3e7	3e7	→ semitone ←
A5	3e8 : 2e12	d4	2e13 : 3e8	3e8	→ major third ←
A2	3e9 : 2e14	d7	2e15 : 3e9	3e9	→ whole tone ←
A6	3e10 : 2e15	d3	2e16 : 3e10	3e10	← minor third →
A3	3e11 : 2e17	d6	2e18 : 3e11	3e11	→ fourth ←
A7	3e12 : 2e18	d9	2e20 : 3e12	3e12	→ octave ←

## PYTHAGOREAN RATIOS OF THE PYTHAGOREAN SCALE, concl.

P12. TABLE VII, following, shows the first eight of the Overtone Series which accompany any musical sound. The Fundamental (original note) is counted as the first of the series. The harmonics (overtones) become progressively fainter, and are scarcely audible after the third overtone or so. The first eight are listed here for purposes of comparison.

P13. Directly below are shown the enharmonic notes of the scale (those occupying the same frequencies). The overtones serve to reinforce the identity of these notes and to correct the minuscule sonic discrepancies generated by the precise ratios which reflect (*lit. resound*) nature. That is to say, they assist the singer to “correct” the frequencies to conform with the acoustically exact intervals. This tendency of singers was attested as long ago as the Sixteenth Century by the Italian theorist Gioseffo Zarlino (1517 – 1590). The issue had become apparent long before with the development of musical instruments which permit only a single value (*e.g.* by use of frets) for each interval. On the other hand, players of unfretted instruments such as the cello constantly, albeit subtly, adjust the pitches of various intervals throughout a performance.

degree	fundamental	second	third	fourth	fifth	sixth	seventh	eighth
<i>do</i>	256	512	768	1024	1280	1536	1792	2048
<i>re</i>	288	576	864	1152	1440	1728	2016	2304
<i>mi</i>	324	648	972	1296	1620	1944	2268	2592
<i>fa</i>	341.33333	682.66666	1024	1365.33333	1706.33333	2047.66666	2389.33333	2730.66666
<i>sol</i>	384	768	1152	1536	1920	2304	2688	3072
<i>la</i>	432	864	1296	1728	2160	2592	3024	3456
<i>ti</i>	486	972	1458	1944	2430	2916	3402	3888
<i>do</i>	C4	C5	G5	C6		G6		C7
<i>re</i>	D4	D5	A5	D6		A6		D7
<i>mi</i>	E4	E5	B5	E6		B6		E7
<i>fa</i>	F4	F5	C6	F6		C7		F7
<i>sol</i>	G4	G5	D6	G6		D7		G7
<i>la</i>	A4	A5	E6	A6		E7		A7
<i>ti</i>	B4	B5	F#6	B6		F#7		B7

P14. CODA. In conclusion, it is appropriate to emphasize that the purpose of these Tables and the accompanying essay *The Acoustic Basis of the Diatonic Scale* is not to espouse any specific system of temperament, but to demonstrate the properties of sound which generate the diatonic scale. Just as the choice of instrument affects the pitch of various intervals, so likewise does the anatomy of the human voice. The data cited above describe sound produced in an isolated acoustic environment, *i.e.* without distortion in either production or place. Even so, the strength of the system and the tonal “ear” of those who participate generally compensate for any tonal ambiguity.